WINSTON CHURCHILL TRUST REPORT.

By

John J. Keast.

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WINSTON CHURCHILL TRUST REPORT.

JOHN J. KEAST.
Telecommunication Vocational
Development Officer.

1981 FELLOWSHIP.

Victoria.

Royal Victorian Institute for the Blind,
557 St. Kilda Road, Melbourne 3004 Vict.

HV3198
R517

"GIVE US THE TOOLS, AND WE WILL FINISH THE JOB."

- - - Winston (later Sir Winston) Churchill, in a speech broadcast to President Roosevelt, 9th February, 1941.

ACKNOWLEDGEMENTS.

I wish to express my appreciation to the Chief Executive Officer of the Winston Churchill Memorial Trust, Mr.R.A.L. Morant, O.B.E., for his untiring efforts in negotiating for extra private funds to allow me to undertake my Churchill Study Tour.

Being only partially sighted myself such a tour would have been impossible without the service of a guide.

Through the generosity of an anonymous donor, who provided the necessary financial support, together with the Board of Management of the Royal Victorian Institute for the Blind, and the co-operation of Telecom Australia, I was exceedingly fortunate to be accompanied on my Fellowship travels by Mr. R. Fielding of Telecom Australia.

Mr. Fielding has worked with me for the last fifteen years on telecommunication equipment for operation by the blind and partially sighted, and his expertise in this field was invaluable during my study tour.

To all concerned, I extend my sincere appreciation.

JOHN J. KEAST.
Churchill Fellow, 1981.

John J. Keast

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SECTION 1. PURPOSE OF FELLOWSHIP.

To study the adaptation of electronic telephone switchboards and Telex equipment for operation by the blind and partially sighted, and the training for their use, in Israel, Italy, Germany, France, Holland, Sweden, United Kingdom, Canada and the United States of America.

SECTION 2. PERIOD OF STUDY TOUR.

From 2nd July, 1981 to 10th October, 1981. (14 weeks).

SECTION 3. SUMMARY OF PROGRAMME ACHIEVEMENT.

Thanks to the opportunity afforded to me by the Churchill Trust, I am pleased to report that I consider I now have, in theory, all the documentation and technical electronic information necessary to convert the latest Australian electronic telephone switchboards for use by totally blind and partially sighted operators, using the latest developments in synthesised speech.

Telex, too, could now become a reality for the blind as an employment opportunity in Australia, although I was greatly surprised to find that no country I visited, despite information to the contrary prior to leaving on my tour, had developed Telex for the blind.

In addition, synthesised speech could be introduced for the following new job opportunities for the blind and partially sighted in Australia : word processing, major overseas Telecom trunk booking positions, airline booking offices using visual display screens and similar organisations using such equipment.

During the course of my study tour I was strongly advised to visit Japan. I regret that this was not possible as the period allowed under the conditions of my Fellowship had expired.

SECTION 4. ELECTRONIC SWITCHBOARDS FOR BLIND AND PARTIALLY SIGHTED OPERATORS.

4.1 Preface : The primary purpose of my Fellowship Award was to study the latest developments, world wide, for the adaptation of telephone switchboards for totally blind and partially sighted operators, concentrating my attention particularly on the latest SPC (Stored Programme Control) electronic switchboards. This "new breed" of switchboard was causing considerable concern to blind telephonists in Australia in view of the fact that a considerable amount of information was provided for the operator on built-in Visual Display Screens. Naturally, such information was useless to the totally blind and impossible to read by the partially sighted, except in certain cases, i.e. those with Retinitis Pigmentosa - "tunnel vision".

The research I undertook was particularly directed towards suitable modifications for both the blind and partially sighted switchboard operators, constantly bearing in mind the models of electronic switchboards already introduced into Australia by the seven major companies and approved by Telecom Australia, which were causing concern to Australian blind telephonists.

Ideally, I was searching for one simple system which would not only be applicable to every type of electronic switchboard in Australia, but more importantly would be suitable to the totally blind and the partially sighted operator.

Such a system would simplify training methods and eliminate the multiplicities and variations of blind modifications introduced by the individual manufacturers. In the electronic field only two manufacturers had made any attempts and both had concentrated on modifications for the totally blind. Neither had produced a complete answer whilst, surprisingly, all had ignored the needs of the legally blind partially sighted operator, despite the fact that the statistics I studied in all the countries I visited showed the ratio to be 80% partially sighted to 20% totally blind. Statistics in Australia substantiate these overseas percentages.

With the advancements in electronic engineering progressing at an unprecedented rate it was surprising to find such

a variance in modifications for the blind as I travelled from country to country.

In my opinion, the simplest solution applicable to both the totally blind and partially sighted is synthesised speech. In countries where this method was being tested the operators, irrespective of their degree of sight, were performing as efficiently as any of their fully sighted counterparts.

Before reaching such a conclusion it was vital to see and assess the various modifications introduced by each country, and, more importantly, to understand why such varying modifications for the blind had been introduced.

4.2 Israel : Arriving at the first country of my itinery, Israel, I visited switchboards in Jerusalem, Tel Aviv and Haifa.

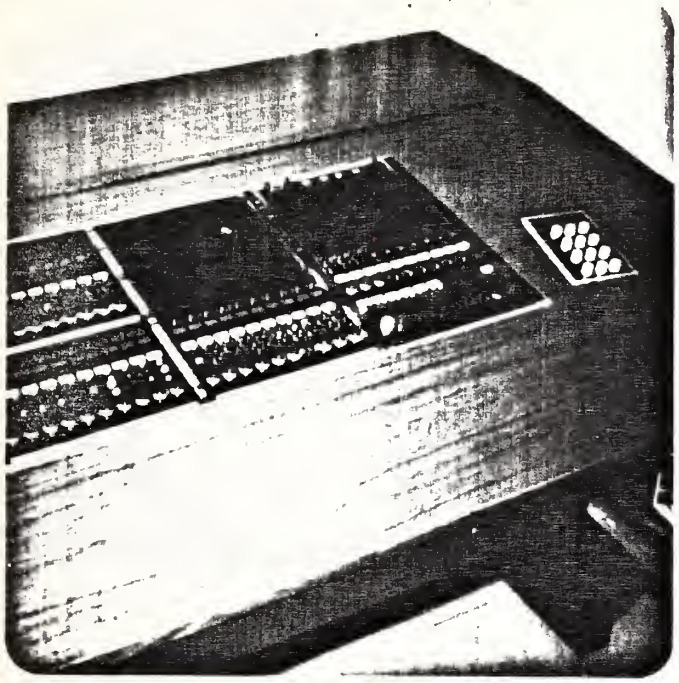
The majority of switchboards were of the old electro-mechanical P.A.B.X. variety, and all were modified as for the totally blind. All lamps were removed and tactile braille pins incorporated. These tactiles pulsed at varying rates thus indicating the condition of the call.

The new electronic SPC (Stored Programme Control) switchboards of local manufacture were modified in a similar manner, but unfortunately, according to the operators questioned, this method was not very satisfactory. Electronic switchboards are equipped with LEDs (Light Emitting Diodes) instead of lamps, and the power required to illuminate the LEDs was not sufficient to activate the tactiles in a satisfactory manner. It should also be noted that information displayed on the VDU (Visual Display Unit) screen was of no value.

The authorities in Israel were very interested in the Australian Telecom portable optic fibre probe unit which was sensitive enough to locate the LEDs, converting small lights into audible tones. (See Section 7, sub-section 7.1.)

Great interest was shown, in principle, in synthesised speech, but concern was expressed, as to date nothing had been produced in this field in Hebrew.

ISRAEL.



A.1 Tel Aviv

Electro-mechanical P.A.B.X. with tactiles.
(Resembles Australian S.T.C. model.)

A.2 Jerusalem

Electro-mechanical P.A.B.X. with tactiles.

A.3 Tel Aviv

Electro-mechanical P.A.B.X. with tactiles.

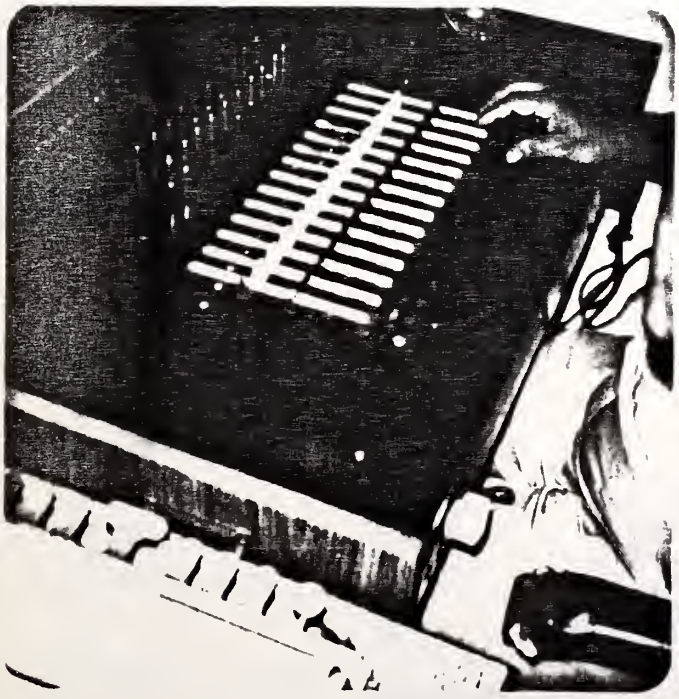
ISRAEL.

A.4 Tel Aviv

Tactile P.A.B.X.

A.5 Tel Aviv

Stored Telephone Number Teledex.



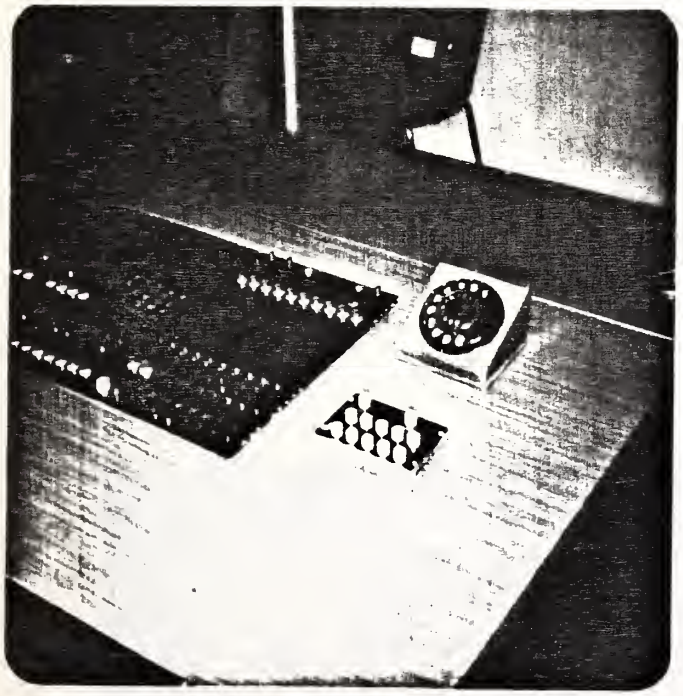
A.6 Haifa

Rehabilitation Centre Training Switchboard.

A.7 Tel Aviv

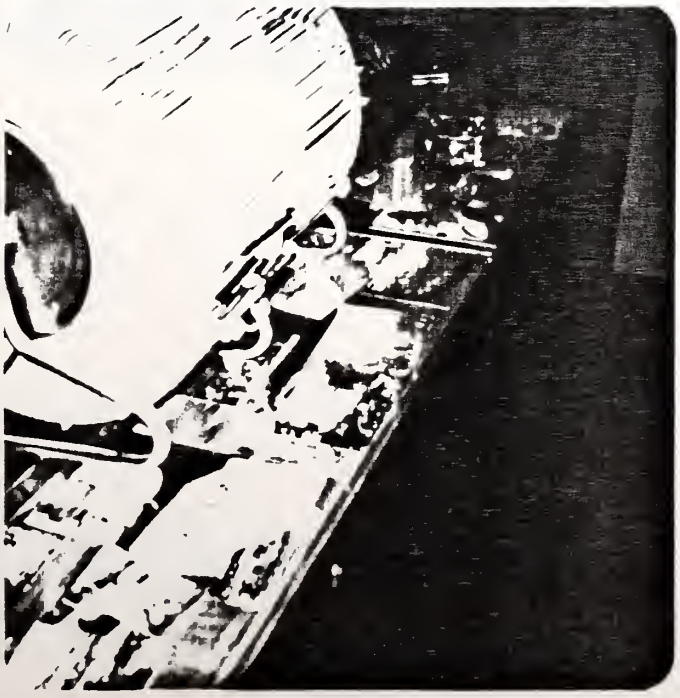
SPC Electronic P.A.B.X. Switchboard. Tactiles - VDU Display.

4.3 Italy : In Italy, and particularly Rome, the same situation existed as in Israel. Tactiles were used exclusively but appeared to function a little better than those used in Israel. In northern Italy, I visited a tactile manufacturer at Bergamo where considerable research was in progress developing a far more sensitive tactile unit for electronic SPC switchboards. They were also making great progress with a braille reading strip which would "display" in braille the information shown on the VDU screens.



A.8 Rome

Electro-mechanical P.A.B.X. with tactiles.

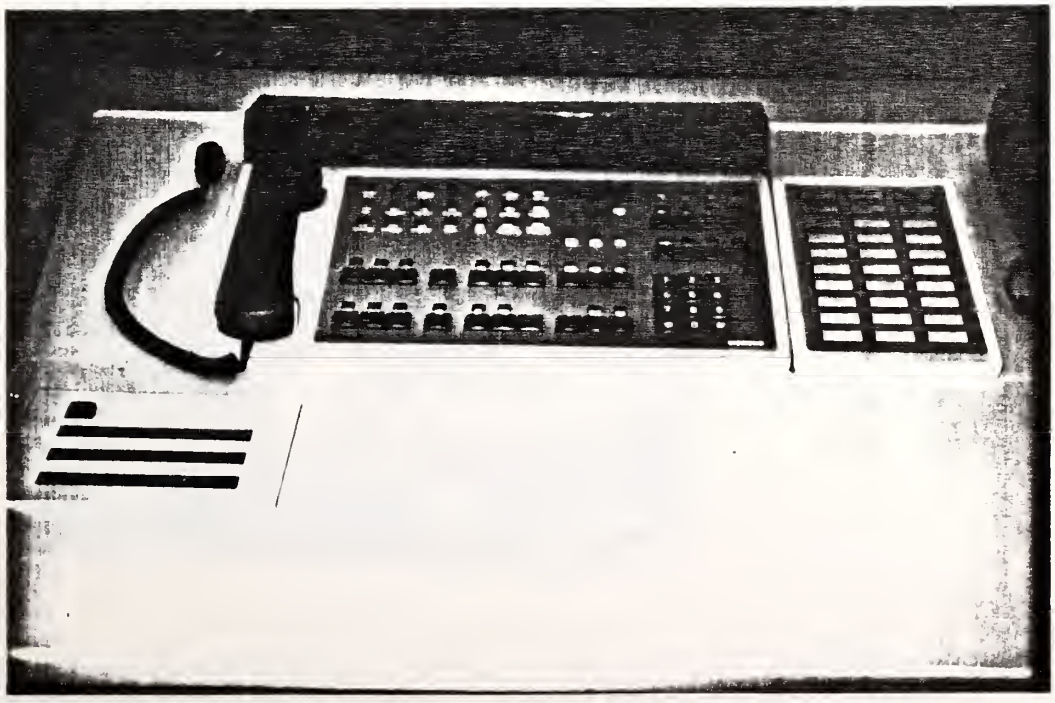


A.9 Rome

Braille Teledex.

4.4 Germany : Munich gave me the opportunity to see, for the first time, an electronic switchboard with the braille reading strips in operation. I was particularly interested in this system as it is intended to introduce it into Australia. I was very impressed with the tactile display in braille, which would be excellent for the totally blind, but on the other hand I was concerned for the 80% partially sighted operators in Australia, the majority of whom cannot read braille!

I consider it very important to record that it is the policy in Europe, particularly in Germany, for all blind (partially sighted as well as totally blind) to learn braille - thus the strong emphasis on tactiles and braille strip read-out of VDU screens.



A.10 Munich

Siemens SPC electronic switchboard with braille reading strips linked to VDU screen.

A.11 Munich

Operator using braille reading strip.

On a visit to Heidelberg, however, I was surprised to find that the electronic switchboards were equipped with the braille strip read-out, braille paper tape record equipment and synthesised speech.

After observing the operators for some time I enquired which of the three systems they used in order of preference. Most of the time the synthesised speech was predominantly used and preferred, secondly the braille read-out, and thirdly the braille paper tape as a record only.

A.12 Heidelberg

Electronic (SPC) switchboard equipped with Thiel braille paper tape read-out, synthesised speech and braille tactile read-out.

France, Holland and Sweden had nothing further to offer in the electronic switchboard field. All switchboards were equipped with tactiles and research into synthesised speech adaptations was in progress.

4.5 <u>England</u> : It was with great interest that I entered the London stage of my study tour, as prior to leaving Australia I had received the following information : -

> "The attachment of a synthesised speech unit, to facilitate blind operation of the electronic switchboard consoles, is the outcome of discussions held with the Royal National Institute for the Blind (R.N.I.B.) on the most suitable approach to blind operation.
>
> The use of synthesised speech to present information displayed on the VDU console is the first application to stored programme electronic switchboards in the U.K.
>
> The National Research Development Corporation (N.R.D.C.) has sponsored development on behalf of the R.N.I.B., for attachments to the P.A.B.X.No.7 and the P.M.B.X.No.4, by Imperial College, London. An agreement was reached with N.R.D.C. to develop the required interface for the Plessey PDX and associated software development.
>
> This development will be further extended to enable production of a standard unit, which by the insertion of the appropriate interface and control programme will serve the above-mentioned P.A.B.Xs and P.M.B.Xs." (1)

The first example of this technique was seen at the R.N.I.B. on a P.A.B.X. switchboard. Interfaced with the operator's console was a micro-processor controlled synthesised speech unit which provided the blind operator (partially sighted or totally blind) with information such as exchange line activated, recall, extension digited, etc.

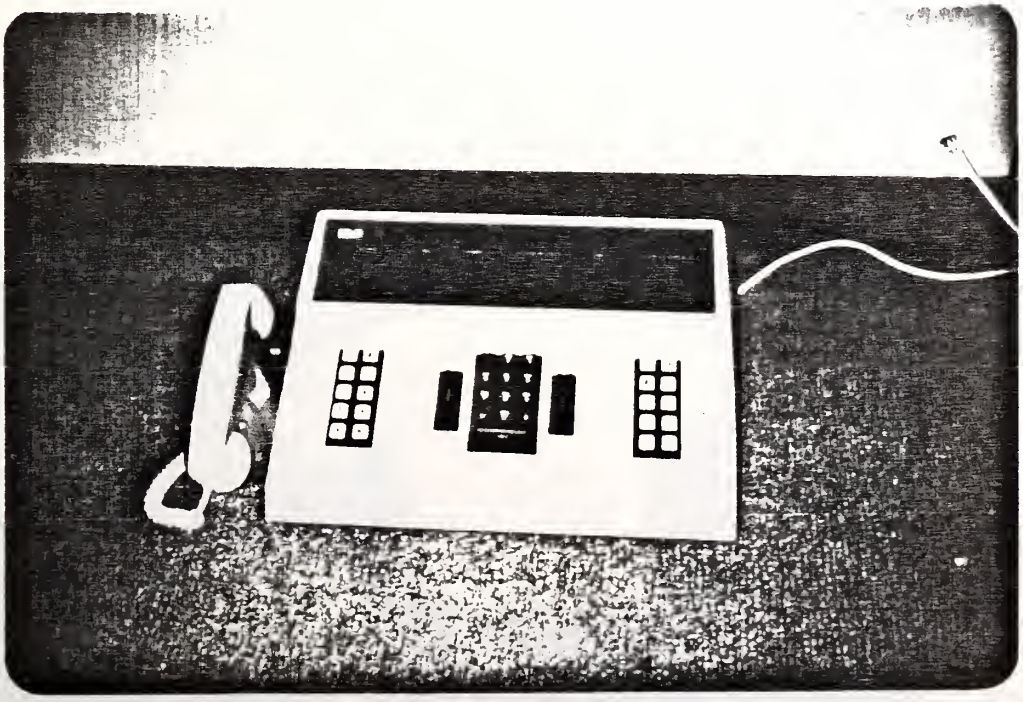
The second installation I saw was at the Midland Bank where a micro-processor controlled synthesised speech unit had been interfaced with a Plessey PDX electronic console. This unit provided the blind operator with the information displayed and also identified the calling signal on the loop select keys, (incoming exchange lines, recalls, service lines, etc.).

It was interesting to see that the blind operator need not necessarily be "swamped" by an unnecessary amount of verbal information, but could select the level of information presented. Using a supplementary keypad the operator was able to list out in synthesised speech displayed information as required.

1. Plessey PDX Blind Operators Console Manual. Issuel. 6.4.81.

A.13 London

Synthesised Speech Unit for P.A.B.X. Switchboard.
Royal National Institute for the Blind.



A.13a London

Rolm Corporation SPC P.A.B.X. Switchboard with full synthesised speech as introduced by Plessey (England) at the Midland Bank.

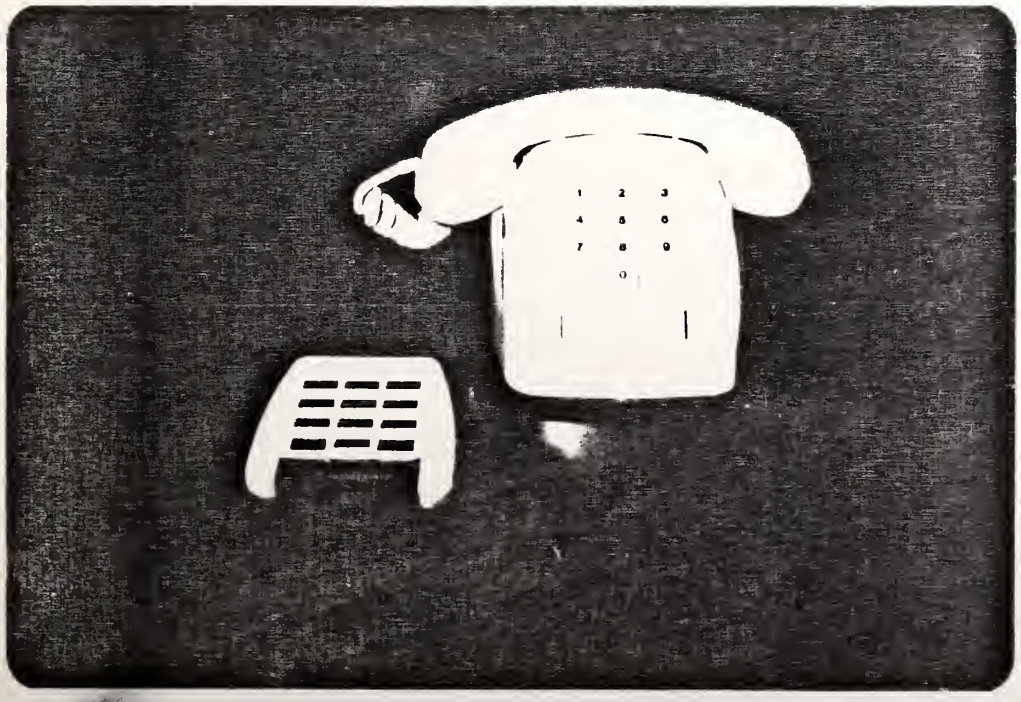
Whilst in London I visited Barclays Bank where I spent a very interesting and informative afternoon. The management of the Bank should feel very proud of their policy and achievements in the field of blind telephony, for they employ 120 blind telephonists, which surely must be unique in the western world.

Whilst at the Bank I was very interested to hear of a recent visit to France by the administrator, where she had investigated the latest I.T.T. (International Telephone and Telegraph) electronic switchboards using synthesised speech.

It was with surprise that I noted what she had to say, as prior to leaving Australia I was informed that I.T.T. were not working in this field.

Great interest was shown in the Australian portable probe unit for electronic and electro-mechanical P.A.B.X. switchboards already in use, particularly when it was pointed out that the use of such a sensitive probe unit, with training, increased the efficiency of the operator by up to 10%, compared with the tactile method.

Much helpful information was received from British Telecom. Their production of a keypad overlay for the Touchfone was of interest, and should prove to be of great assistance to the elderly blind - in fact to most handicapped persons.



A.14 <u>London</u>
Keypad Overlay.

Before concluding this sub-section I feel I should comment on the introduction by the R.N.I.B. of their own Electronics Department. In operation for only eighteen months, it has contributed considerably to the progress already made with synthesised speech, and I am sure will play a vital part in the development of word processing, etc.

It was also of interest to hear from their Placement Officer that employment for the blind in Britain had moved almost completely into the commercial and clerical fields and almost entirely away from the industrial field.

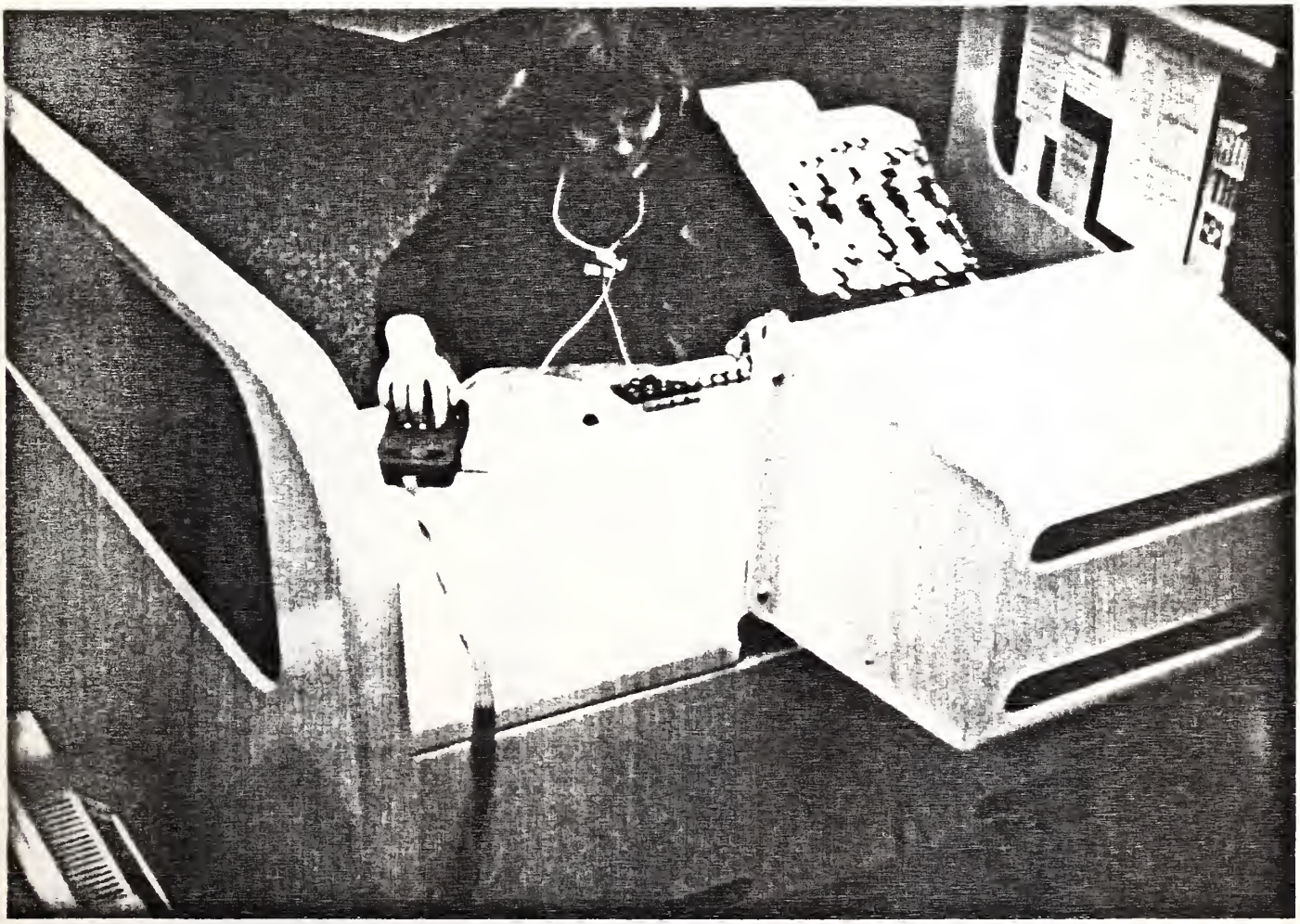
4.6 Canada : My main reason for visiting Canada was to investigate positions held by totally blind operators in a large exchange handling national and international calls. My visit to the Bell Corporation Telephone Company in Toronto was a revelation, for nowhere in the world had I seen such a large installation so competently handled by a totally blind operator using synthesised speech.

The speech unit was, as in England, separate, and was interfaced with the Visual Display Unit. All information appearing on the VDU screen was spoken in clear speech to the blind operator through a separate ear piece, similar to one used to listen to a transistor radio. On the other ear a very light headset was worn.

It was interesting to observe that at no stage did the blind operator receive speech commands or information from the VDU whilst talking to the subscriber. All synthesised speech information could be controlled at will by the blind operator.

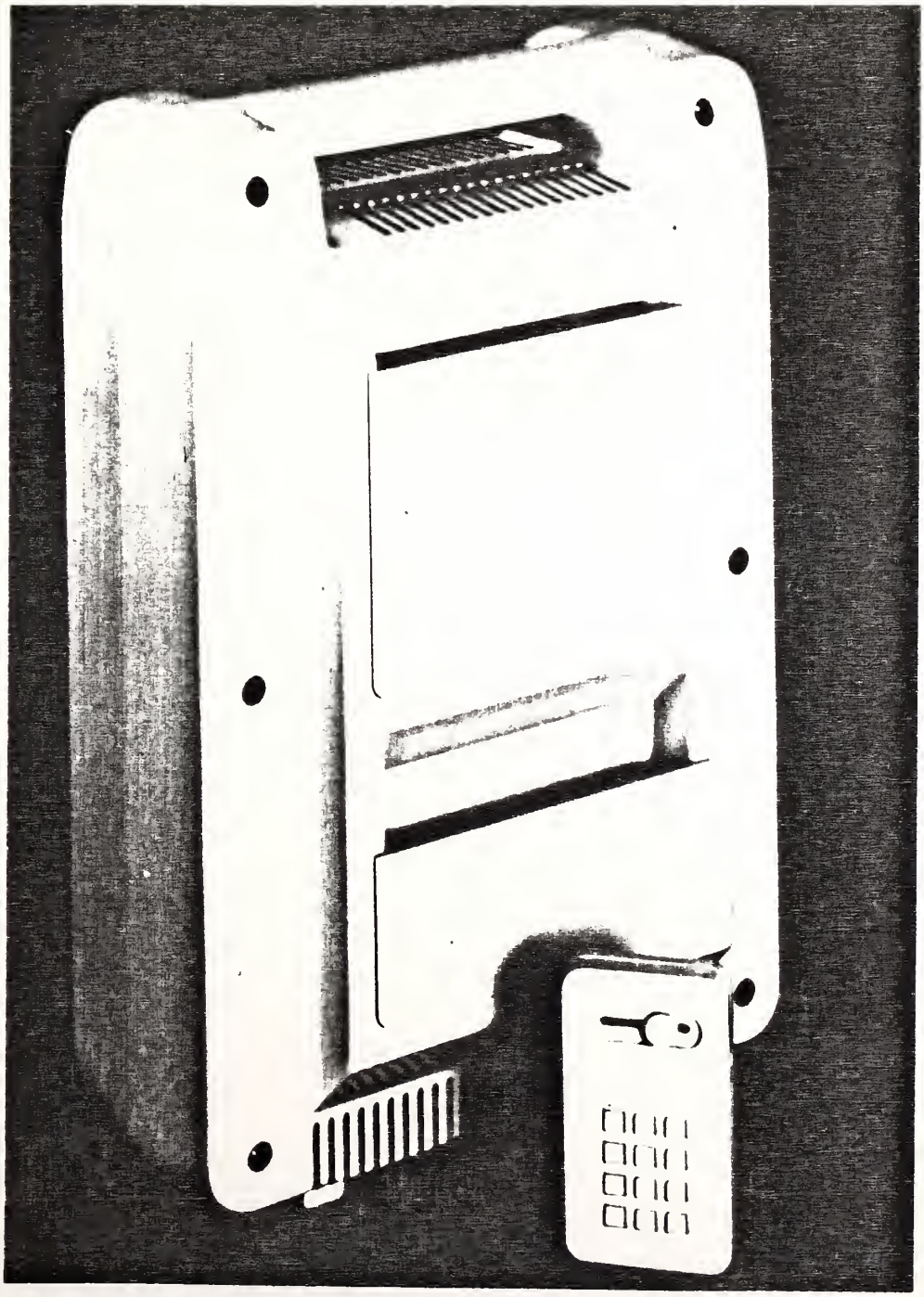
Again it is important to record that this project from its beginning was conducted jointly by the Bell Corporation, the Canadian National Institute for the Blind and the blind telephonist, who was consulted throughout each stage of the development of the programme.

There was no doubt as to the success of the venture, for it was impossible to identify the blind operator amongst the fifteen others in the complex.



A.14a <u>Toronto</u>.

Miss Anne Weatherby, a totally blind telephonist, operating an international console, TOPS position, using the BOI full synthesised speech device, at the Bell Corporation Telephone Company, Toronto, Canada. (Photograph by courtesy of Bell Corporation.)



A.14b <u>Toronto</u>.

BOI full synthesised speech portable device developed by Bell Corporation, Toronto. (Photograph by courtesy of Bell Corporation.)

4.7 U.S.A. : In each of the American states I visited tremendous strides had been made in the field of synthesised speech research, development and application. (See Section 7 - "Commercial Electronic Developments for the Blind and Partially Sighted.")

My study tour was mainly concentrated on the East Coast, Philadelphia and Wayne, both in Pennsylvania, and New York, progressing to Kentucky and on to the southern West Coast. Some electronic switchboards were observed, all but one using synthesised speech output.

4.8 Summary : With concentrated investigations having been conducted from Israel, through Europe, Great Britain, Canada and the U.S.A., I was personally convinced that synthesised speech was the ultimate for the blind and partially sighted telephonists, as not only did it eliminate all barriers, but, in my opinion, was the complete solution to the Australian situation, where virtually nothing using synthesised speech had been developed.

I concentrated my attention on the various types of synthesised speech outputs, seeking : -

1. The clearest voice reproduction.
2. Availability.
3. The best price.

The 1981 answer is, in my opinion, not difficult to find, namely the Texas Instruments Synthesised Speech Board and the Total Talk Full Speech Board as incorporated by the Maryland Computer Services Inc.

At the present time these synthesised speech boards, particularly the simpler, cheaper Texas Instruments board, would be the simplest to develop. Whereas full synthesised speech would be excellent for the Australian SPC P.A.B.X. requirements, such detailed information is not necessary. Simplicity and brevity of information would be all that would be needed in the Australian Stored Programme Control Speech Units. Suffice to say that the limited vocabulary provided by the Texas Instruments Synthesised Speech Board would supply adequate information, thus keeping the costs of developing such a speech unit to a minimum.

To enable costs to be reduced further I would strongly recommend that Australia follow the overseas example shown by Britain, France, Canada and the U.S.A. - that any synthesised speech unit produced should be a separate unit, readily able to be interfaced with any type of electronic SPC P.A.B.X. switchboard, rather than being produced as an integral part of the various manufacturers consoles.

I was also greatly impressed whilst in Holland, Sweden, Germany, Britain and the U.S.A. to visit the Electronics Research Department of each Institute. Manned by a staff of one in England to seven in New York, they were performing invaluable work not

only in the field of synthesised speech, but in the much wider field of electronics "by the blind - for the blind". For a full report on these electronic developments, see Section 7 - "Commercial Electronic Developments for the Blind and Partially Sighted."

Whilst some countries had switchboard training facilities, most training was performed, as it were, "on the job". The training which was available in schools and rehabilitation centres was very limited in comparison to those available at the Royal Victorian Institute for the Blind in Melbourne, Victoria.

These facilities, without doubt, are the most comprehensive in the western world. Not only do they possess traffic simulators, but they incorporate switchboards from all the major companies operating in Australia.

I am proud to say that these training facilities are available to any legally blind person within Australia, or to a handicapped person in Victoria, irrespective of disability, provided they are approved for training by the Commonwealth Rehabilitation Service, Department of Social Security, in Melbourne, Victoria.

However, with the introduction of the new Stored Programme Control P.A.B.X. equipment, which has been introduced into commerce over the last two years by the seven major Australian manufacturers, it is regrettable that our present training equipment will rapidly become redundant.

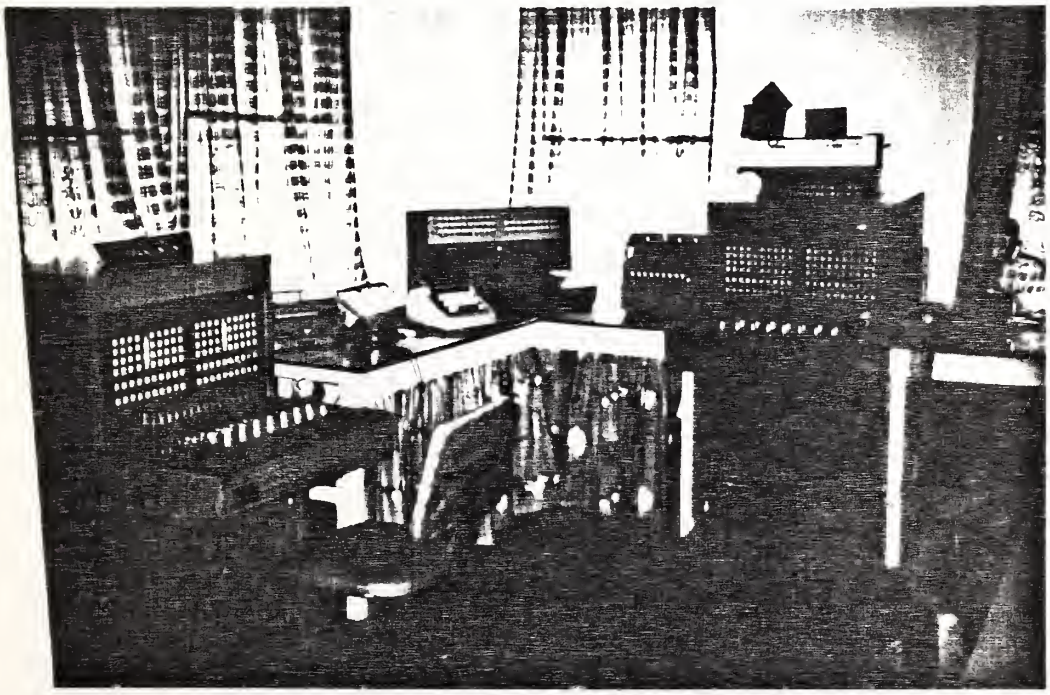
Electro-magnetic P.A.B.X. consoles will, in my opinion, rapidly disappear, thus presenting a real threat to our existing blind and partially sighted telephonists.

Meaningful negotiations are urgently needed, not only with the various manufacturers, but with Telecom Australia and institutional management to ensure that the rapid advances in electronics, particularly in the telecommunication field of telephony, does not result in a steady loss of telephonist positions for the blind. If measures are not taken in the near future this regrettable situation will, in my opinion, become a reality, as some cases have already demonstrated.

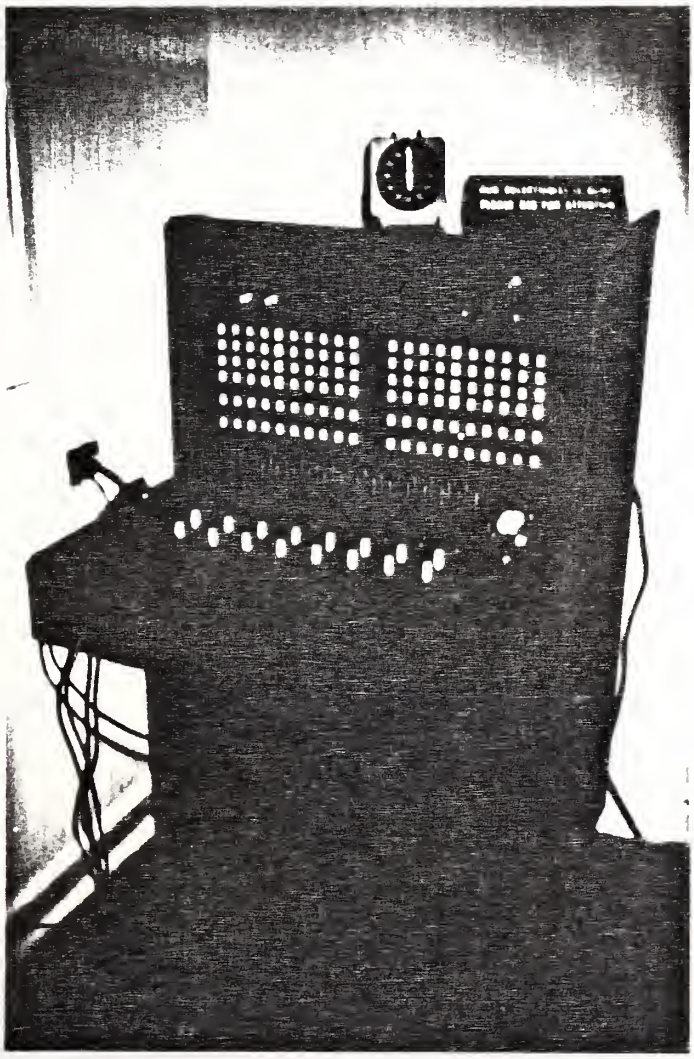
This may appear to be a gloomy outlook. However, the

development of synthesised speech units as separate units would reverse the situation completely, opening a greater field of employment for the blind, enabling them to achieve a degree of independence and efficiency which has not been possible in the past.

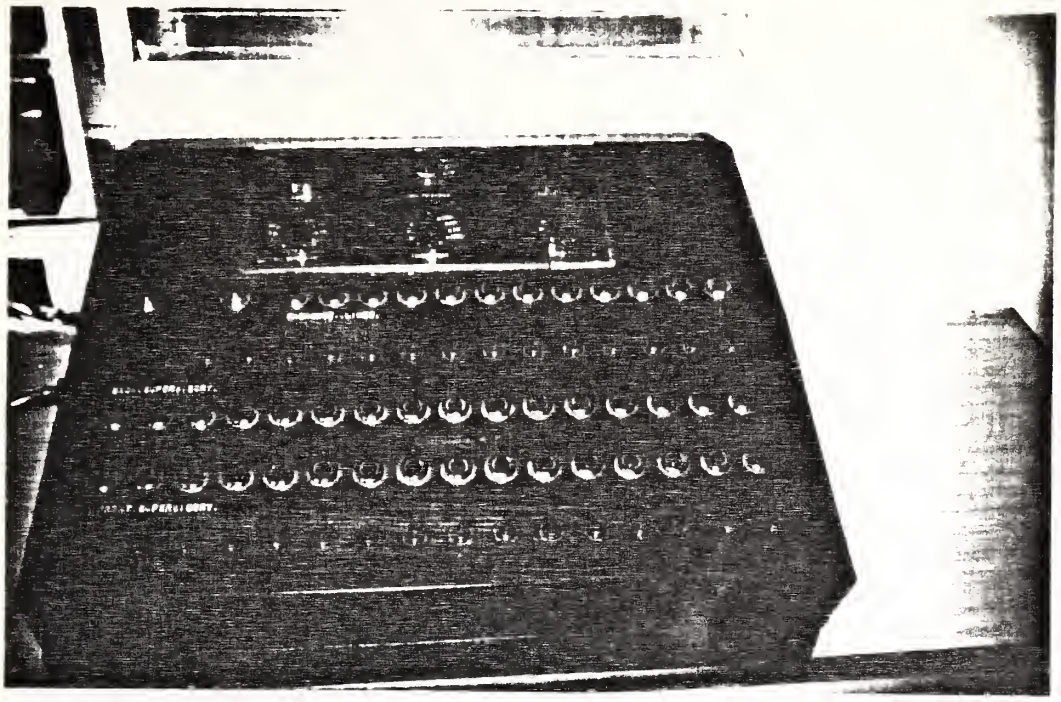
ROYAL VICTORIAN INSTITUTE FOR THE BLIND - Switchboard Training Centre.



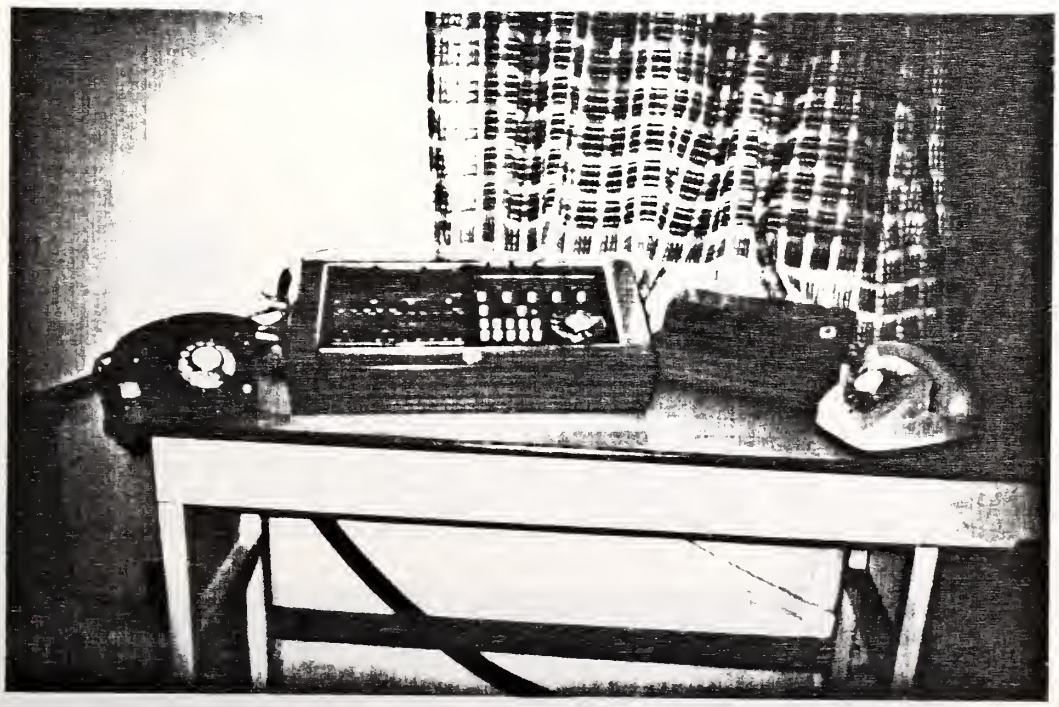
A.15 General View of P.M.B.X. Training Facilities.



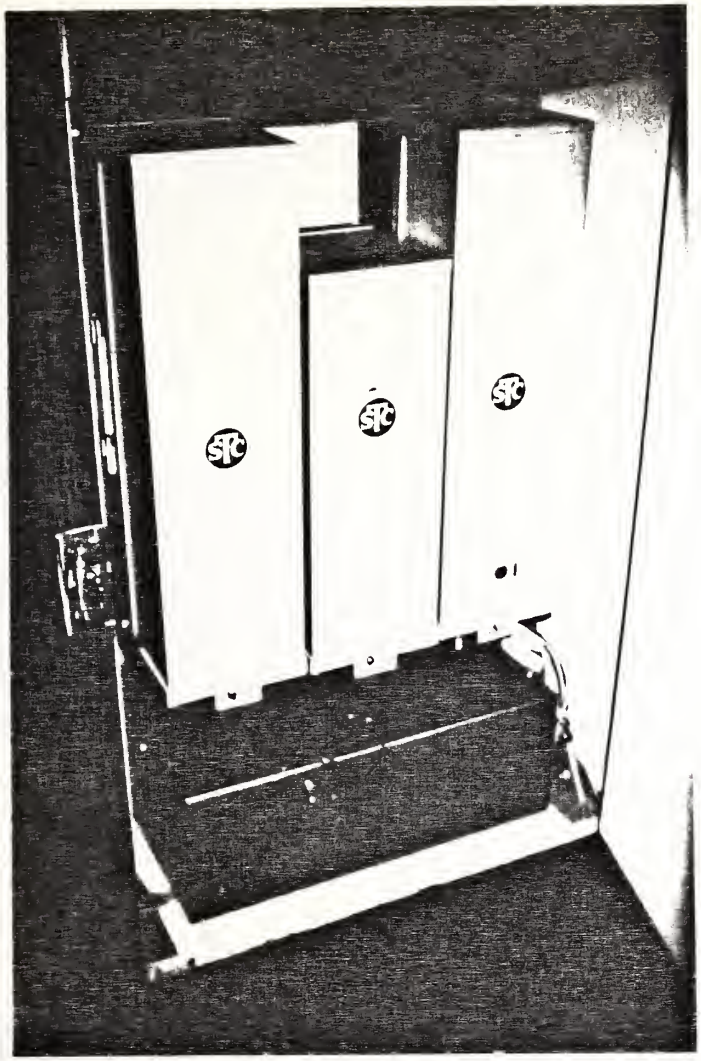
A.16 Room 1 - Telecom P.M.B.X. Training Board connected to complete instructor's traffic simulator in separate room. (See A.17)



A.17 Instructor's traffic simulator from P.M.B.X. switchboard. (See A.16).



A.18 Room 2 - S.T.C. Pentaconta electro-mechanical P.A.B.X. switchboard with instructor's traffic simulator.

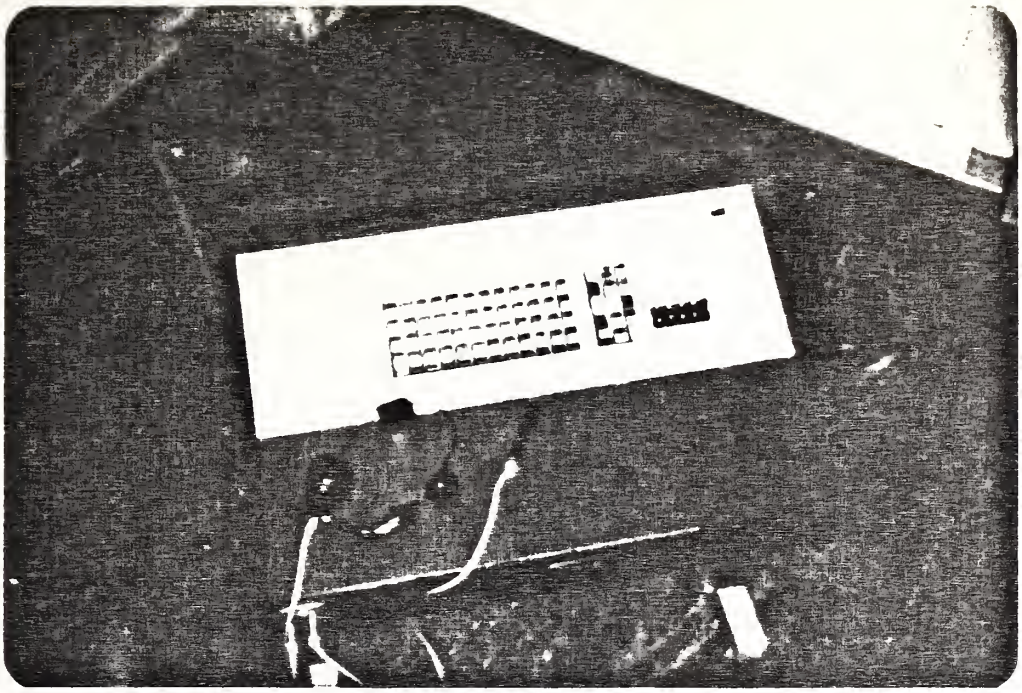


A.19 Electro-mechanical equipment for S.T.C. Pentaconta P.A.B.X. switchboard.

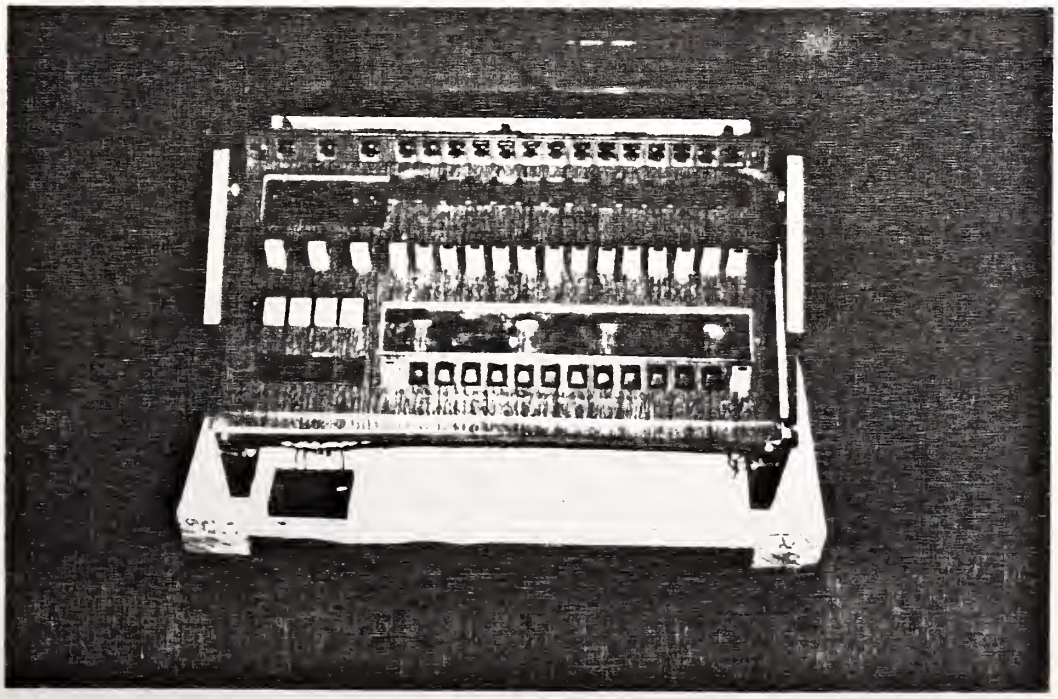
A.20 Room 2 - S.T.C. Minimat semi-electro-mechanical and Stored Programme Control P.A.B.X. switchboard.

A.21 Room 3 - L.M. Ericsson AKD 741 electro-mechanical P.A.B.X. switchbaord.

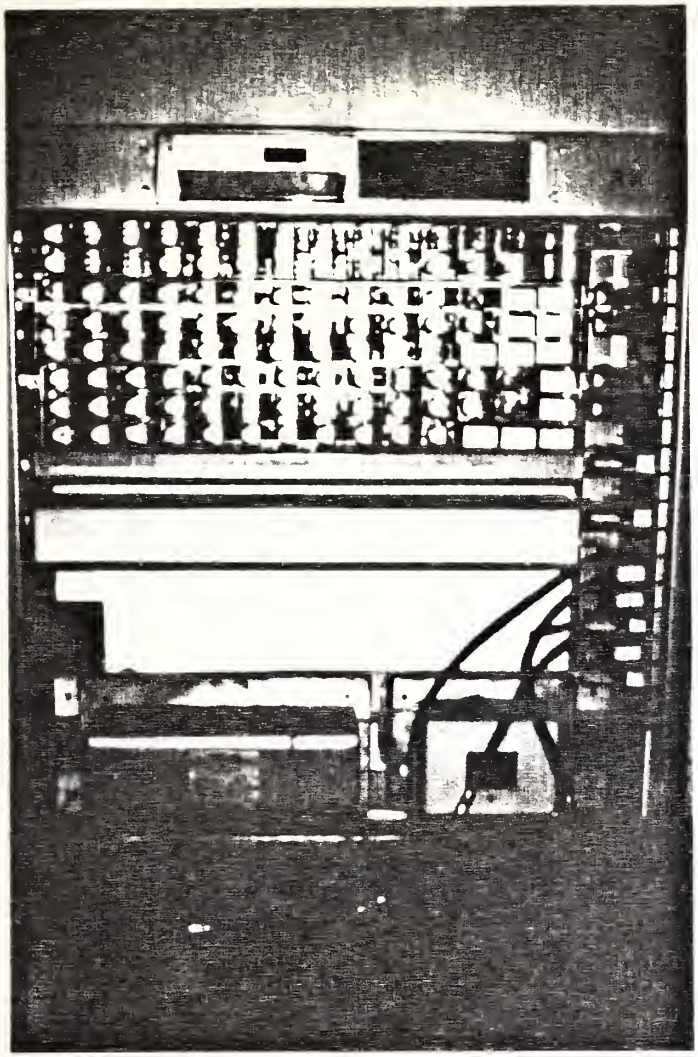
A.22 L.M. Ericsson ARD 571 electro-mechanical P.A.B.X. switchboard with instructor's traffic simulator.



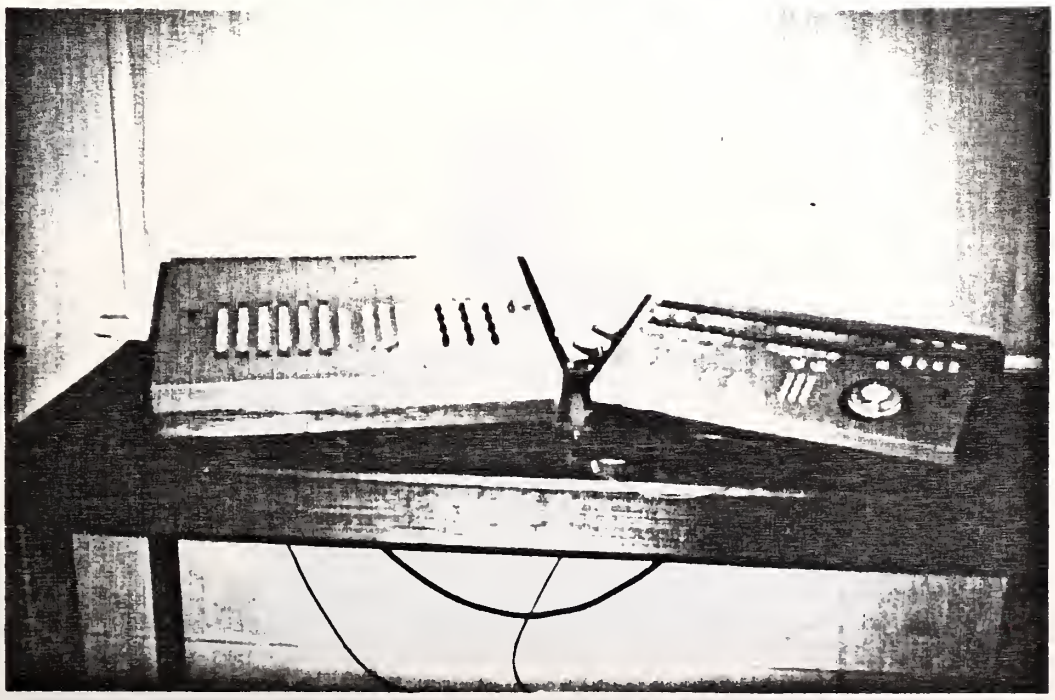
A.23 L.M. Ericsson ARD 591 electro-mechanical P.A.B.X. switchboard.



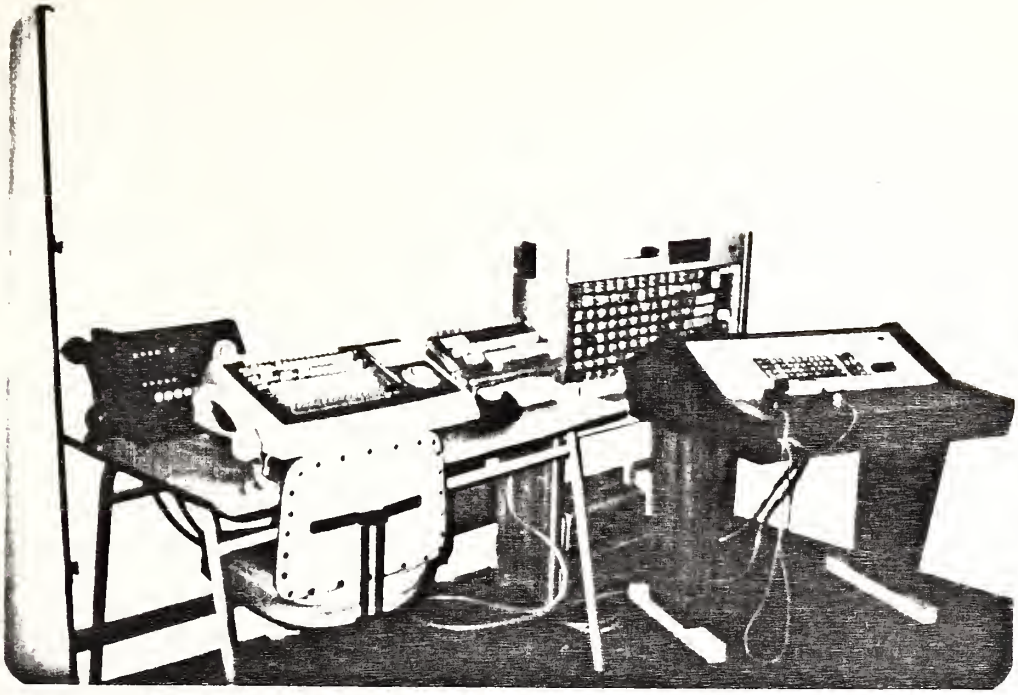
A.24 Instructor's traffic simulator for L.M. Ericsson ARD 591 electro-mechanical P.A.B.X. switchbaord.



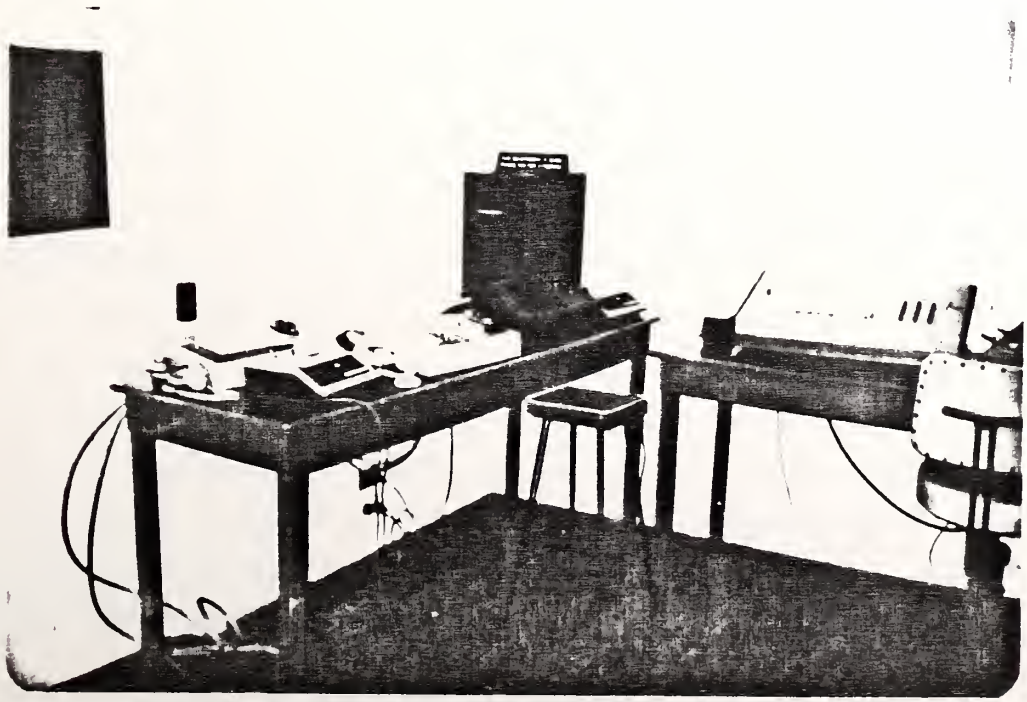
A.25 Electro-mechanical equipment for L.M. Ericsson ARD 591 P.A.B.X. switchboard.



A.26 A.W.A.-Hitachi electro-mechanical P.A.B.X. switchboard with instructor's traffic simulator (on left of picture).



A.27 General view of Room 3 - on right, L.M. Ericsson ARD 591 electro-mechanical switchboard with simulator, etc. centre, Telecom P.M.B.X. 5/16 switchboard (fully operational), and left, S.T.C. CA type P.A.B.X. switchboard (fully operational).



A.28 General view of Room 3 - L.M. Ericsson ARD 561 electro-mechanical P.A.B.X. switchboard with instructor's traffic simulator. This photograph also shows portion of the A.W.A.-Hitachi equipment.

SECTION 5. TELEX FOR BLIND AND PARTIALLY SIGHTED OPERATORS.

5.1 Preface : With the ever-increasing developments in electronics, particularly in the field of the "Electronic Stored Programme Control Switchboards", the telephonist of today is forced to face the reality that in many cases the position of telephonist/receptionist is no longer a full time occupation.

In an increasing number of positions additional duties are added by the employer, such as typing, telex or clerical duties.

For the blind or partially sighted telephonist/receptionist this has presented an almost insoluable problem, as naturally their lack of vision does not permit the inclusion of "additional duties", other than some menial tasks such as mail franking or enveloping.

In recent years, this unfortunately has resulted in the termination of the services of some blind telephonists.

No employer can be blamed, for such a situation has surely been created by the rapid growth in electronic technology. Having worked for many years with some brilliant electronic technologists within Telecom Australia I have come to appreciate one very important fact. If advancing technology temporarily results in the creation of adverse employment situations - seek an alternative. Almost every position applicable for the blind or partially sighted has a solution, provided the latest electronic knowledge and techniques are applied.

Prior to leaving Australia I had amassed a wealth of information regarding "Telex" operation as adapted for the blind, and it was with great anticipation that I welcomed the opportunity to study this subject in Israel, Germany and France where I had been informed it was a major form of employment. The following results speak for themselves.

5.2 Israel : On my third day in Israel I travelled by bus to the Israeli-American Lighthouse which is a superb rehabilitation centre for the blind in Haifa.

My first enquiry concerned the "Phylab" Brailler; I understood that this consisted of an apparatus which, when interfaced with Telex, produced a braille read-out on continuous paper tape. I also had been led to believe from literature received in Australia that this equipment had been updated and refined.

I had assumed that this equipment would be fully operational, particularly as I knew that the Phylab Brailler had been purchased by the Royal Blind Society of New South Wales some years ago, and I had heard no adverse reports.

It was with amazement and disappointment that I learned that this equipment was obsolete and had certainly not been updated, having proved unsatisfactory in field trials.

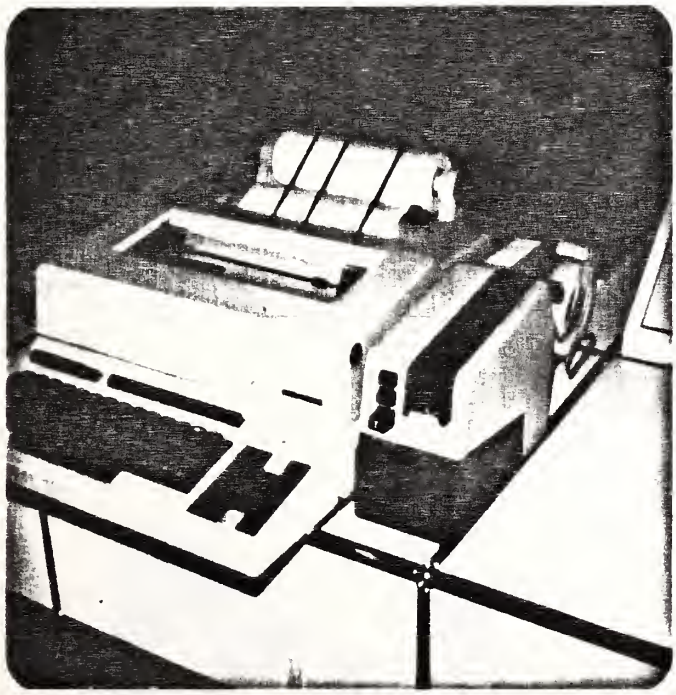
The Rehabilitation Centre did, however, have Telex training equipment. Two Telex machines had been procured, and had been connected to enable messages to be sent from one machine to the other and vice-versa. At considerable expense, braille tape output equipment had been purchased from a manufacturer in Germany, which, when interfaced with the Telex, would enable blind Telex operation to be a viable, efficient employment avenue.

Undoubtedly, the imported equipment was impressive, but unfortunately was non-operational due to two factors. Firstly, the non-supply, despite requests over four years, of two vital component parts, and secondly, the non-availability of the blank paper tape spools for the necessary braille output.

My disappointment upon hearing these facts was obvious, but to the staff who had seen in "Telex operation for the blind" an additional form of employment not only in its own right, but in conjunction with switchboard operation, its failure had proved to be a very expensive and frustrating exercise. Personally I left disillusioned, hoping that perhaps in Germany I would find a solution to the Telex Question!

5.3 Germany : With a very "tight" itinery to adhere to I spent one full day investigating switchboards and Telex at Siemens Industries in Munich - Germany's largest and, as far as I am aware, the only manufacturer of Telex equipment in the country.

Their latest Telex equipment was excellent, but no provision or research into modifications for the blind had been considered. Interest was shown in my suggestions, and I sincerely trust that research into blind adaptations will be undertaken in the near future.



B.1 Munich

Siemens Industries latest Telex - no adaptations for the blind operator.

B.2 Munich

Siemens Industries latest Telex.

5.4 Stiftung Rehabilitation Centre, Heidelberg : In my opinion this rehabilitation complex was one of the most advanced in Europe. Some brilliant work was being undertaken, particularly in the Electronics Department, details of which appear in Section 7 of this report.

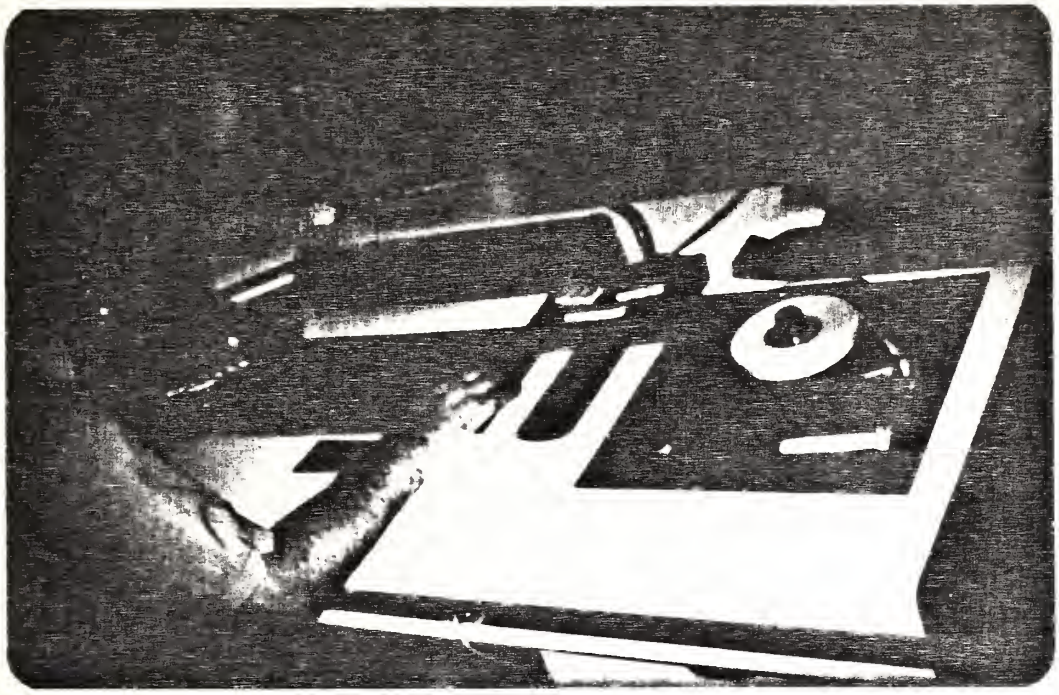
At Stiftung, when enquiring of Telex adaptations for the blind, I was surprised to be informed that Telex was not taught. This information was a disappointment, as I had received information regarding the "Braillomat" Telex (see B.5) which was produced by H.J. Thiel, Jugenheim, Pauerweg 4, Postfach 88, which is approximately one hours train journey from Heidelberg.

Throughout my tour of this Rehabilitation Centre, the Thiel equipment had been applied in two fields only - as a typing aid and as a braille record notation device for telephonists.

Braillomat: Maschinenschreiben mit gleichzeitiger Blindenschriftangabe

B.3 Heidelberg

Braillomat used as a typing aid.



B.4 Heidelberg

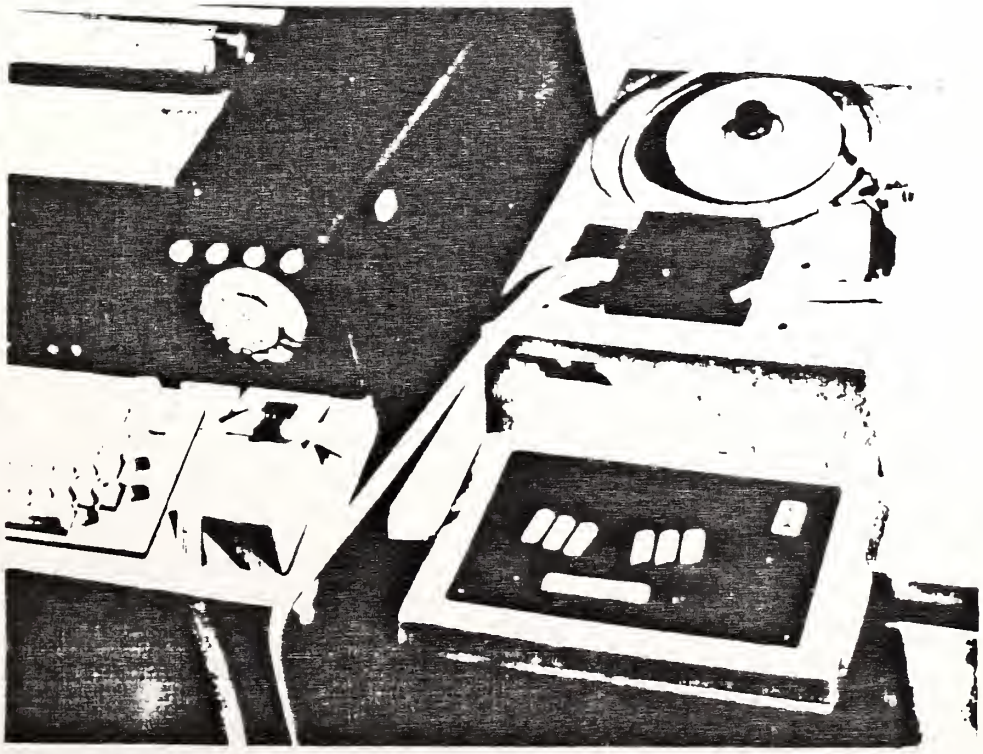
Braillomat used for keeping switchboard records in conjunction with electronic switchboard with synthesised speech.

This Thiel equipment functioned very efficiently, particularly in the typing and switchboard fields, but in the latter case, taking into consideration the cost, it was, to my mind, an added luxury which could have been replaced by a simple tape recorder.

From advice I received in a number of European countries I could not help but form a strong impression that excellent as this equipment was, it would appear that its availability was questionable. In my view, it was readily available in the Heidelberg area of Germany, but in other countries, particularly in those I visited, either unobtainable or, as in the case of Israel, unusable due to lack of supply of parts and operational materials. This situation was, I felt, regrettable.

B.5 Extract of Brochure on Thiel Braillomat Telex.

THIEL



Braillomat Telex

The New

Braillomat-Series

for the Blind as
Teletypists
Computer-Programmers
Stenotypists
School Training Equipment

B.5 Extract of Brochure on Thiel Braillomat Telex.

The incorporation of the blind into useful vocations is an essential task in the rehabilitation of the physically handicapped. Valuable and reliable employees can be gained with the creation of jobs for blind stenotypists, teletypists, or computer programmers. The training of blind persons for more responsible jobs, such as those mentioned above, opens not only new channels for the blind worker, but serves, also, the best interests of industry. The new BRAILLOMAT series is a further development of already existing attachable devices based on modern electronics and opens new possibilities for schools and careers.

BRAILLOMAT Standard — The Braillomat Standard consists of an embossing machine for braille paper tape, a six-point braille keyboard, and the electronic controls. Used alone this machine performs as a stenotypewriter. Its advantage is easy and rapid writing. In combination with other appliances, the Braillomat Standard can be used in schools for both teaching and practice purposes. For the blind individual, it replaces the teacher's wall board. A specially designed control board is available for connecting the Braillomat Standard to other machines. Special tables may also be procured.

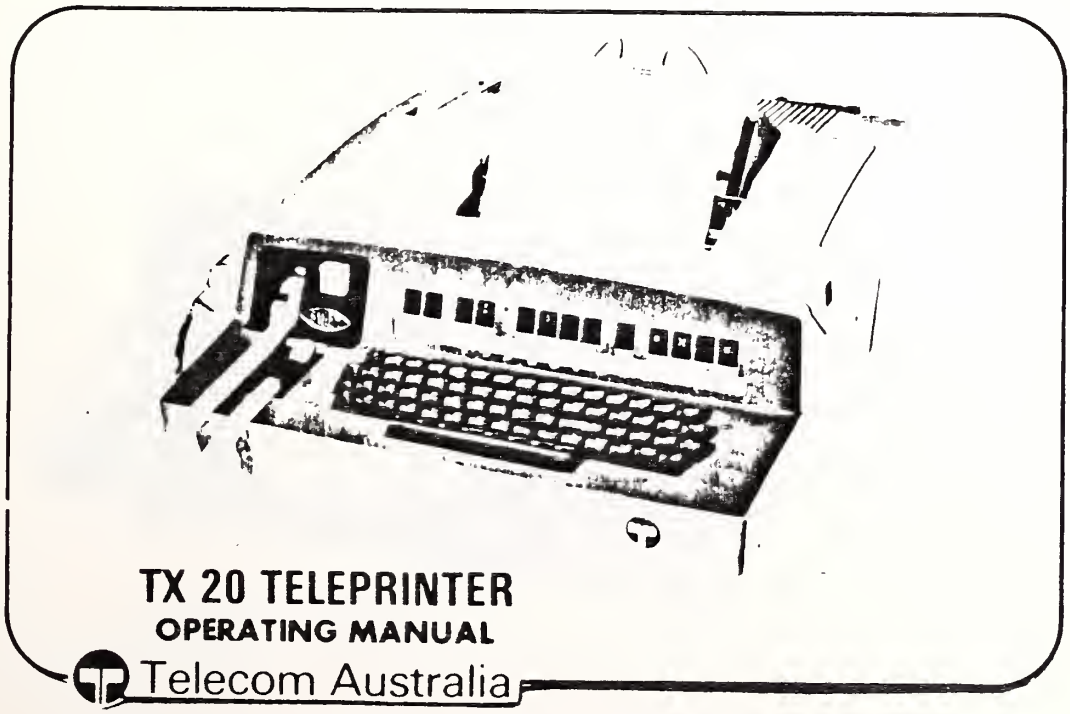
BRAILLOMAT TELEX — The Braillomat Telex is a further evolution of the supplementary telegraph appliance for the blind developed by Ing.Bur.Dipl.Phys. H.J. Thiel. The Braillomat Telex can be easily connected to any telegraph by a simple plug and receptacle arrangement. It has been accepted by the German postal system. In many schools for the blind, teletypists are being trained and have proved themselves capable and efficient workers in the industry. The Braillomat Telex has helped to create interesting and responsible occupations for the blind.

BRAILLOMAT Korrespondenz — The Braillomat Korrespondenz is an electric typewriter (e.g.IBM 73) with a normal correspondence keyboard and the attached Braillomat. The Braillomat converts electronically the impulses received from the typewriter into braille and simultaneously prints them on a paper tape. By touching the paper tape before him, the blind person can, at any time, check what he has written on the typewriter, including sentence punctuations and all functions of the typewriter, such as spacing, etc. After a pause in typing, by touching the last inscribed text, the blind individual can find easily his place in the written material.

5.5 France : Prior to leaving Australia the most promising developments in Telex for the blind had, I was assured, been completed by the Sagem Company situated 350 km. west-south-west of Paris, at Fougeres.

After this long journey (we had been advised prior to arrival in Paris that the distance was 40 km.) I had expected to be shown the first working prototype for the blind of the Sagem TX20, which is widely used in Australia.

Again I was to be disappointed, as no research into modifications for the blind had been undertaken, nor were any planned for the future.



B.6 France

TX20 - Sagem Company.

It seemed ironic that no work had been done in regards to Telex operation by the blind or partially sighted in France, when in Australia we had already trained two partially sighted telephonists to use the new TX20. In my view, the TX20 was admirably suited to adaptation for the partially sighted, as certain features already incorporated were of assistance to these

operators. Naturally further adaptations would be required, details of which had been submitted to Telecom Australia.

Whilst visiting Sagem I was shown the new Telex TX35, which could be introduced into Australia in the near future.

B.7 France

TX35 - Sagem Company.

5.6 Summary : To enable the Telex to be operated efficiently by the totally blind the interfacing of a Versabraille would be an answer. It should, however, be understood that the Versabraille uses, for its input and output, the 7 bit ASCII code, whereas the Telex uses the Baudot code, which requires a figure code preceding a series of figures and a letter code preceding a series of letters. This, however, can be accomplished electronically Modifications for the blind and partially sighted could also be achieved by introducing Votrax Field synthesised speech. Details of other alternatives appear in Section 7 of this report.

Although I have written at length of the Sagem equipment, there are, in Australia, a vast number of Telex machines in operation manufactured by Siemens Industries.

Over the years organisations have suggested employment for the blind as Telex operators. Only one blind person was ever successfully trained and placed, due to the introduction of a small tactile device, manually operated, which allowed the blind Telex operator to read, by touch, the Telex punched tape. Unfortunately, the production of this Siemens unit was discontinued in the 1950s, and no other units, other than the one we were using, were available in Australia or Germany.

Although this Siemens unit created employment in the Telex field it was really only suitable for use by organisations with a small Telex traffic volume.

When sending any Telex message it is vital for the correct coding to be sent at the commencement of the transmission. e.g.:

31550
OTC AW30606
COURHIL AA31550
GA

TEXTILE GROUP COURTAULDS HILTON INTENDS REPAYING ITS PREFERENCE CAPITAL IN FULL AND PAYING ORDINARY SHARE HOLDERS 20 CENTS EACH OUT OF SHARE PREMIUM RESERVES, FOLLOWING THE SALE OF SURPLUS PROPERTY.

Note : This Telex example is purely fictitious.

Due to the positioning of the Telex paper print-out of the Siemens equipment it was found that it was impossible for most partially sighted operators to read this information. Closed circuit television incorporating a zoom lens was tried, but this was unsuccessful.

It is now possible, however, to provide access to this information immediately by interfacing the Texas Instruments Speech Board.

This I feel would be the simplest solution. The technology and hardware are readily available, and the result should be a relatively inexpensive modification, thus opening a field of employment for the blind in Australia and in overseas countries.

SECTION 6. LOW VISION TRAINING.

6.1 Preface :

"It is commonly believed that it is bad for your eyes to use them, that it is especially bad to read and even worse to hold the text close to your eyes. The explanation is probably the fact that a connection between impaired vision and a short reading distance has been established. Thus cause and effect have been mixed up. The truth is that people with impaired vision have to hold the text near their eyes in order to be able to read, not that they get "near sighted" by reading "with their noses". The idea that strong lenses should impair vision must, in the same way, be due to a misunderstanding.

Many visually impaired people can learn how to use their remaining vision BETTER if they hold the texts near their eyes, use strong lenses and find a more appropriate way of moving the texts, their eyes or heads. Also those who have very low vision can learn to read at fairly good speed and perseverance. IT IS THEREFORE IMPORTANT TO ESTABLISH THE FACT THAT IT IS NOT BAD FOR YOUR EYES TO USE THEM. This also applies to low vision training with optical aids, and does NOT involve any increased risk for further impairment of the eye disease that has caused the visual defect." (1)

By quoting an eminent ophthalmologist at the commencement of this section I hoped that his words would help to dispel the misunderstandings which exist, not only with the fully sighted, but with the majority of partially sighted clients. On the other hand, the reluctance by clients to use low vision aids such as hand-held magnifiers for more than short periods of time, could be related to the unnatural posture which is quite often adopted by the client to obtain maximum visual benefit from the aid in use.

On my visit to the Swedish National Institute for the Blind, a most impressive organisation, I was particularly interested in their Low Vision Training Programme. Nowhere in Australia, to my knowledge, has such a programme been established. Not only should this training be implemented, it should incorporate the Swedish curriculum and also that used by the Research Centre for the Education of the Visually Handicapped, Faculty of Education, Department of Special Education, University of Birmingham, England.

1. Bo Bengtsson, Ophthalmologist, Sweden. February, 1979.

C.1 Extract of Brochure published by the New York Association for the Blind, Low Vision Service, New York :

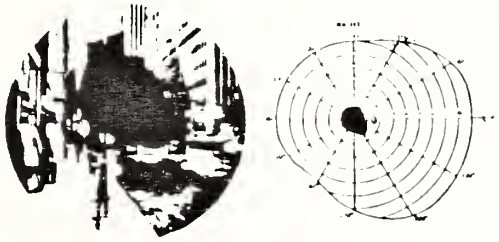
The Lighthouse
LOW VISION SERVICE

presents a photographic essay on partial sight

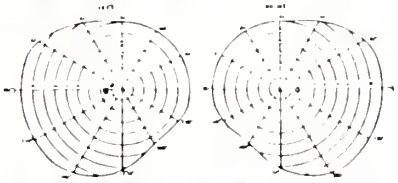
Pictures representing the eye diseases are done as if the camera were the right eye. The accompanying visual field chart showing the area of visual loss also represents the right eye.

Cameraeye photo by D. Arlene Studio
Leonard I. Feys, M.D.
Ophthalmological Consultant

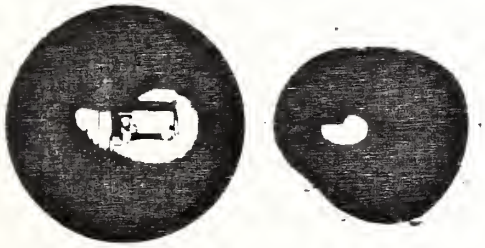
NORMAL VISION. A person with normal or 20/20 vision sees this street scene.



MACULAR DEGENERATION. The most prevalent eye disease. The picture shows the area of decreased central vision called a *central scotoma*. The peripheral or traveling vision remains unaffected.



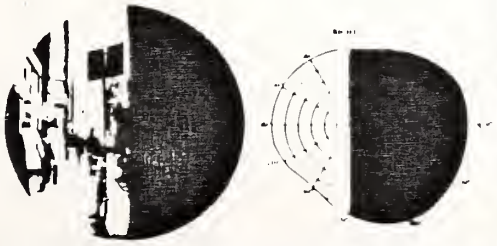
THE FIELD OF VISION (peripheral vision) with both eyes is 180°, recorded on these charts.



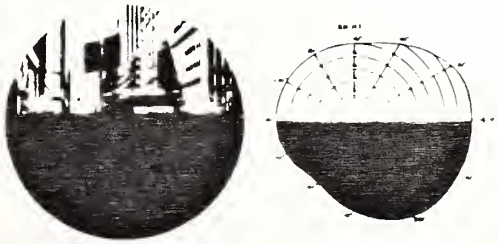
[illegible] Advanced glaucoma involves loss of peripheral vision but the individual still retains most of his central vision. Early detection and cooperation with good medical care can prevent the drastic loss of vision.

CATARACT diminished acuity from an opacity of the lens. The field of vision is unaffected. There is no scotoma, but the person has an overall haziness of the view, particularly in glaring light conditions.

CORNEAL PATHOLOGY. When the cells of the cornea are damaged or injured, the image becomes distorted or clouded so that clear detail is no longer discernible. The field of vision is normal.

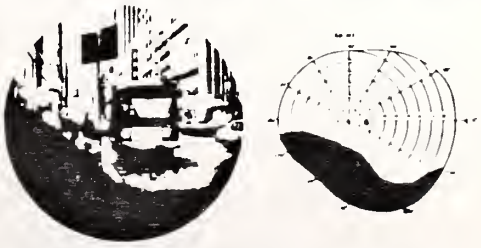


[illegible] a defect in the optic pathways between the eye and brain. Vision is lost in half of a field. The most common defect occurs in corresponding halves of the right field of vision, which causes reading impairment, right homonymous



hemianopia. It can also occur on both left halves of the field of vision. When the defect is an interior hemianopia, there may be interference with traveling and reading. When the visual defect is in the upper half, it is a superior hemianopia.

[illegible] commonly called "tunnel vision." Only a small area of central vision remains in these cases and traveling is difficult without side vision.



[illegible] shown here in the active stage. There are many causes for detachment, but the hole or tear allows fluid to lift the retina from its normal position. This elevated retina causes a field or vision defect seen as a dark shadow in the peripheral field. It may be above, or below as illustrated.

6.2 Reading Aids : At the Low Vision Training School in Stockholm, Sweden, the backbreaking posture position had been eliminated with the introduction of specially equipped reading boards. (See photographs C.2, C.3 and C.4.) During my visit to the Training School I could see that no tedium was experienced by the clients who were using these boards. A considerable amount of attention had been given to both the application of natural light and to the illumination of the reading boards by artificial light. Great care had been taken to ensure that at no stage did the artificial light reflect into the face and eyes of the client whilst reading.

Working in conjunction with an ophthalmologist throughout each stage of the Low Vision Training Course, a client was encouraged to use and, as a result, improve his or her residual vision. A special series of Reading Tests had been devised by the ophthalmologist, and as far as the tests were concerned, those chosen for the client were particularly appropriate for his or her particular visual impairment.

Broadly, clients were graded into four groups, thus : -

(1) Individuals with a difficulty to fixate and to see straight ahead, but where the ability to see sideways still existed.

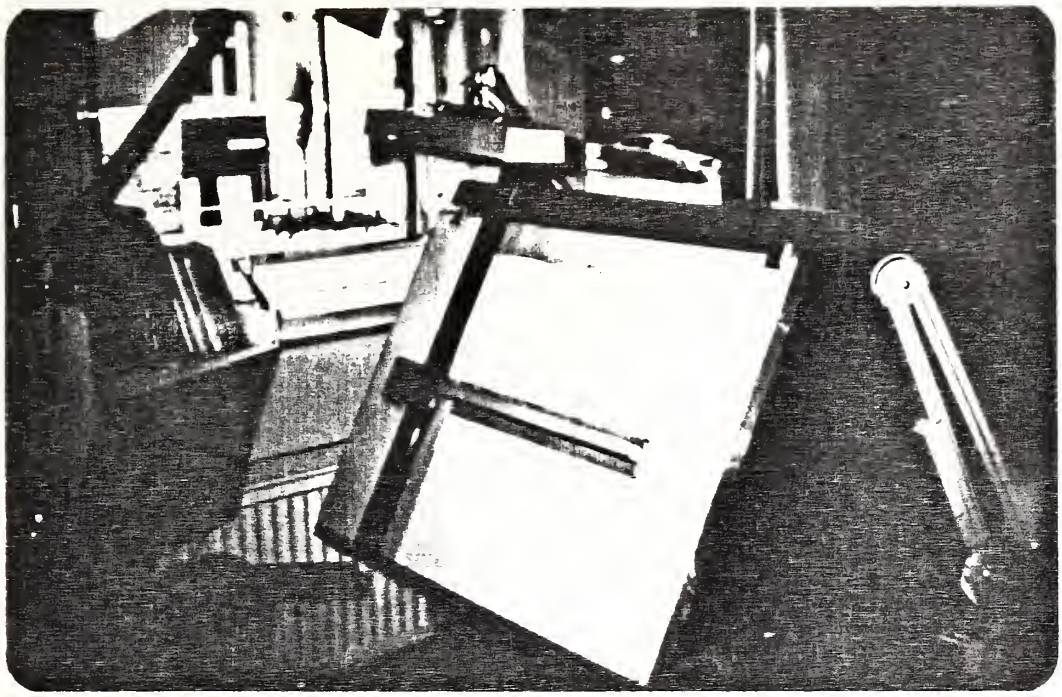
(2) Individuals with excessive trembling of the eye.

(3) Individuals with difficulties in seeing sideways but with some ability to see straight ahead.

(4) Individuals with strong near-sightedness and others who had general visual impairments.

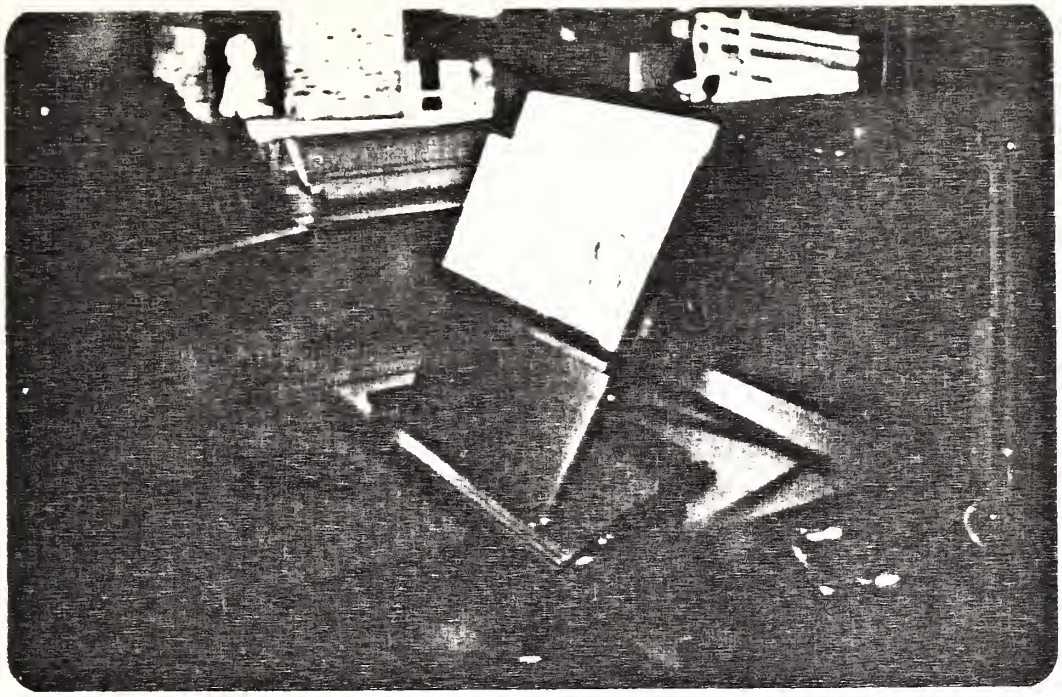
Using the aids prescribed by the Low Vision Clinic, the Low Vision Training School was achieving remarkable results, with clients improving their reading speeds dramatically.

The Training School was also fully equipped with closed circuit television - Magnivision - and every other form of magnifying device which could be employed to ensure the maximum results. (See photographs C.6, C.7 and C.8.)

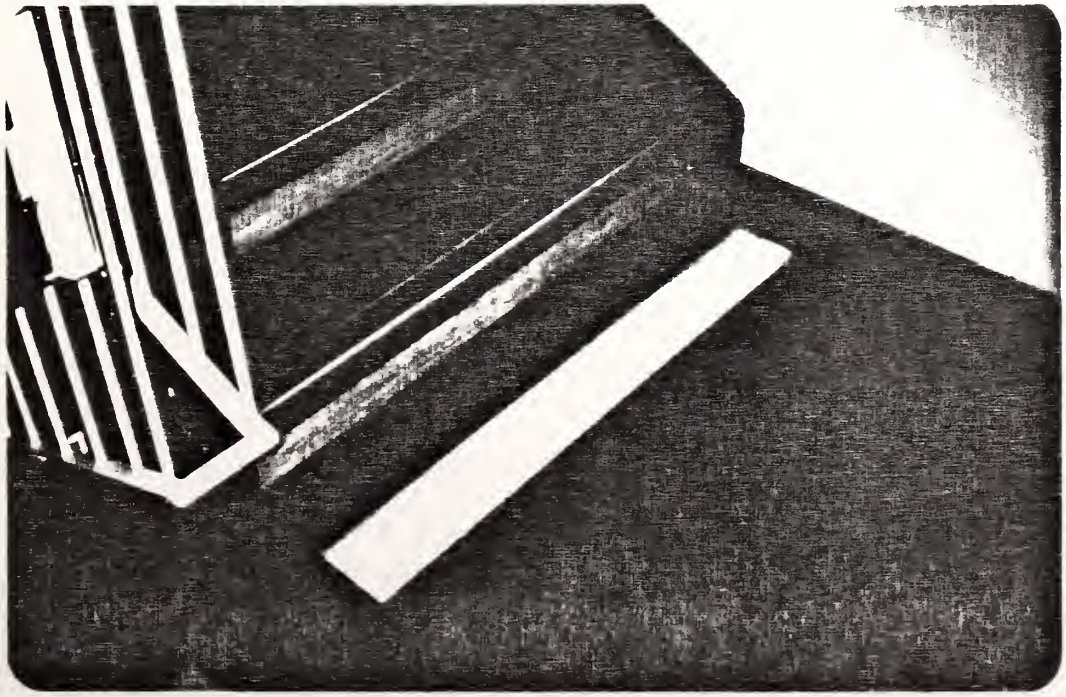


C.2 Low Vision School, Stockholm.
Reading Board.

C.3 Low Vision School, Stockholm.
Special Reading Board.



C.4 Low Vision School, Stockholm.
Special Reading Stand and Table.



C.5 Low Vision School, Stockholm.
Stair Indicator for partially sighted clients.

6.3 Closed Circuit Television : In the Swedish Low Vision Training School the Magnivision - closed circuit television - was, in my opinion, one of the most dominant pieces of equipment. In this day of rapid electronic advances, I had viewed with interest the television equipment used in each country I visited. Being partially sighted myself, with a very low visual acuity, I had always experienced the greatest difficulty in "reading" via this medium. During the initial few minutes my results were usually good, but I always found that I could not maintain a "reading" session for more than 15 minutes. Many students I have taught over the years reported similar experiences.

In my opinion, three systems of closed circuit television stood out. Briefly, they were as follows (also see Appendices III and IV) : -

1. Visualtek (U.S.A.): To date this equipment has been predominantly used in Australia. The company producing this equipment has, in my opinion, improved on the models now in use by introducing the VR-1 VOYAGER. By incorporating a green monitor in place of the black and white model it is far more restful on the eyes, eliminates flickering almost entirely, and permitted me to read for a longer, but still limited, period. (12-inch diagonal screen.)

2. Television Magnifier (Philips, Holland): This model impressed me greatly, particularly the size of the screen, the clarity of the black and white enlarged reproduction and the almost imperceptible presence of flicker. (24-inch diagonal screen.)

3. Magnivision (Sweden): This model was, to me, all that the manufacturers claimed it to be - "the most flexible CCTV in the world". It was not difficult to understand why it was used so widely in the teaching curriculum of the Low Vision School. In my opinion it had an extremely high quality black and white, flicker-free picture, which I personally found able to view and read for well over half an hour. Even after this period I found I was still relaxed, which was almost miraculous. Superlatives are difficult to find to express my enthusiasm for both the fixed and hand-held cameras - suffice to say that they proved

superb, particularly the latter for I found that this gave me a flexibility I had never been able to achieve before. It was with no surprise that I learned from the Low Vision teacher that this system had been developed by the manufacturer with assistance and advice given by visually impaired clients. (17-inch diagonal screen).

C.6 Low Vision School, Stockholm.

Magnivision - Fixed Camera and Hand-held Camera.

C.7 Low Vision School, Stockholm.

Magnivision - Hand-held Camera attached to an Electric Typewriter.

C.8 Low Vision School, Stockholm.
Magnifier attached to Electric Typewriter.

C.9 Holland.
Philips Closed Circuit Television.

6.4 Summary : After spending some considerable time examining all aspects of the Low Vision School, its equipment, teaching curriculum and, above all, the results, I left feeling grateful that I had been able to study an aspect of rehabilitation which hitherto I was not aware existed in such a sophisticated form. Even though excellent work is being done in Australia to provide low vision aids by our Low Vision Clinics, I consider that it would be of tremendous value, particularly to tertiary students and clients in our Rehabilitation Centres, for similar Low Vision Schools to be set up, thus improving the ability of the visually impaired to read and write. Thousands of Swedish visually impaired have been using the prescribed reading exercises for several years with amazing results.

I would like to conclude this summary with the following remarks made to me by Krister Inde, a pioneer of low vision teaching in Sweden. "We ourselves are surprised with the results. We know that people with very low vision can learn to read a text in NORMAL print. We also know that the majority of them can learn to read 100 words a minute and even more. However, we want to emphasise it is not the client's visual acuity which will get BETTER, but MORE IMPORTANTLY he or she will be able to make better use of his or her existing residual vision."

SECTION 7. COMMERCIAL ELECTRONIC DEVELOPMENTS FOR THE BLIND AND PARTIALLY SIGHTED.

7.1 Australian Telecom Portable Probe Unit : Prior to leaving on my study tour Telecom Australia, working in conjunction with the Telephonist Training Centre of the Royal Victorian Institute for the Blind, developed a portable optic fibre probe unit with a greatly increased sensitivity.

The two major advantages which the development of this portable unit provided were : -

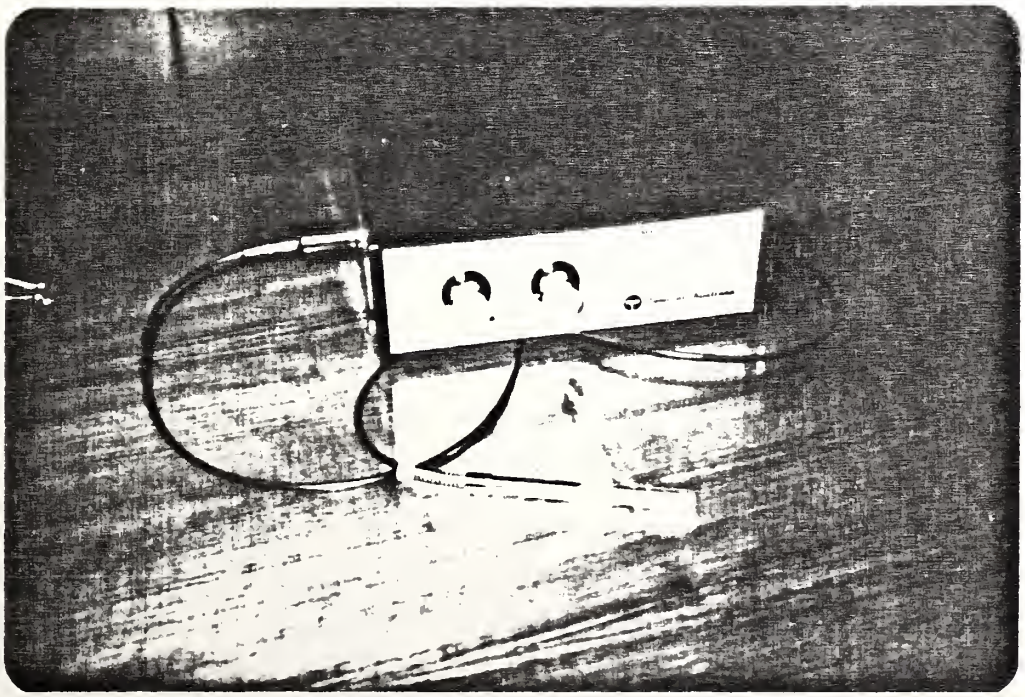
1. Its introduction made it possible for a totally blind telephonist to commence work immediately, whereas, previously, considerable delays were experienced. In some cases such delays resulted in the non-employment of the blind applicant when they were competing with a sighted operator who could fill the vacancy immediately.
2. The increased sensitivity of the new probe unit enabled the blind telephonist to locate LEDs (Light Emitting Diodes) for the first time. This was felt to be of tremendous importance, for no other probe unit previously available in the world was able to achieve this degree of sensitivity.

Although probe units are used as an integral component for the detection of lamps by blind telephonists in Australia and the U.S.A., this was not the case in European countries or in the United Kingdom. As explained in Section 4, I maintain my strong conviction that the use of an optic fibre probe unit would, with training, increase the speed and efficiency of a totally blind telephonist, particularly when it is used to operate electro-mechanical P.A.B.X. consoles.

Most countries showed considerable interest in the new Australian Telecom unit, particularly its application by operators using the electro-mechanical P.A.B.X. switchboards. As stated in Section 4 there is at present, in most western countries, a rapid swing from the electro-mechanical P.A.B.X. switchboard equipment to the Stored Programme Control P.A.B.X. electronic switchboard equipment. For countries which still use the former equipment the new Telecom probe unit would, after a suitable training period, provide a very cheap, speedy and reliable aid, which would make it possible for totally

blind operators to take up their employment as telephonists immediately.

In some countries, such as Israel, Italy, etc., the Australian probe unit would be of tremendous assistance for operators using the new SPC electronic equipment, as the added sensitivity makes it possible for the operator to identify the LEDs.



D.1 Australian Telecom Portable Optic Fibre Probe Unit.

7.2 <u>Optacon with Braille Output, Interfaced with Visual Display Unit, Rotterdam, Holland</u> : This brilliant, simple and cheap development, devised and interfaced by Mr. Leo Van Noorden of the Blind Institute of Rotterdam, was probably one of the most outstanding examples of applied electronics that I saw on my tour. This equipment, incorporating the use of the Optacon converted to a braille (Grade 1) output from a Visual Display Unit, made it possible for any prospective blind employee to read a VDU immediately without the tedium of hours of study and practice learning to read the normal printed letters.

The photograph D.2 was taken in the Electronics Department of the Rotterdam Institute, and this equipment was fully operational during my visit. It will be noticed from the photograph that to the right of the Optacon a small "speed" control has been added. Whilst I was at the Institute the visual display terminal was linked to the Dutch equivalent of the English Prestel - a Telecom service providing a vast bank of information such as news, weather, racing results, etc., which could be immediately displayed on any VDU or television set, by merely dialling a certain prescribed telephone number.

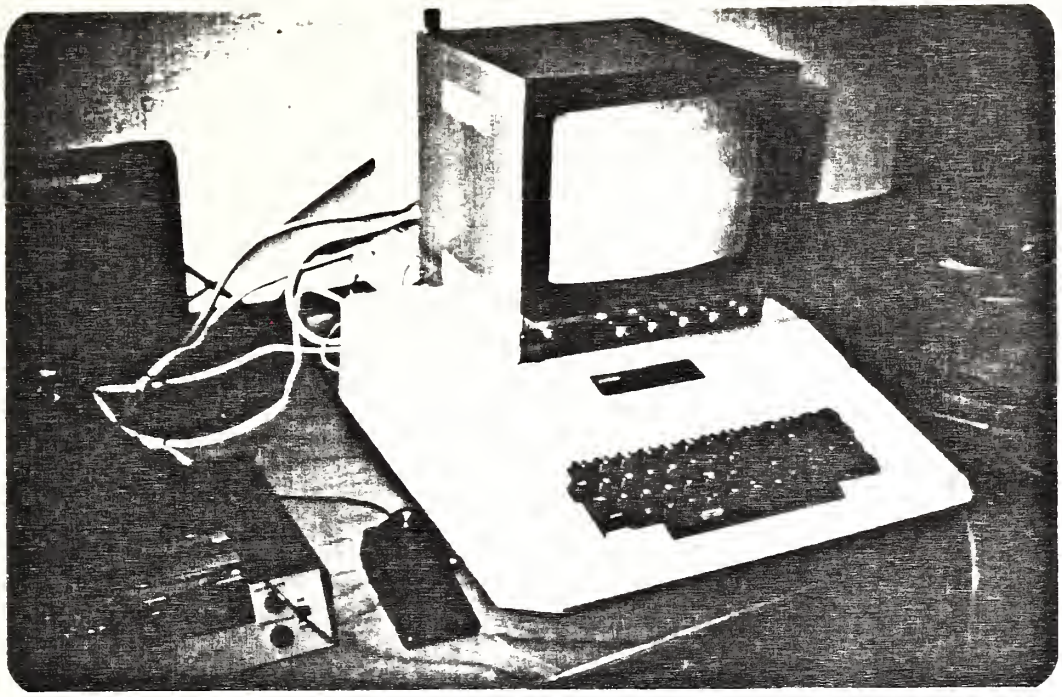
By interfacing the Optacon, a totally blind person could read, in braille, the printed content displayed on the screen. With the addition of the "speed" control, the movement of the Cursor, from left to right, could be controlled. When a blind person wished to read the printed script on the screen, the "speed" control could be very easily regulated, thus ensuring that the Cursor moved from letter to letter of the script at a rate the blind reader preferred.

Unlike the demonstration illustrated in D.3 taken at the Stiftung Rehabilitation Centre at Heidelberg, Germany, the Dutch equivalent equipment did NOT use the small TV Optacon camera. No optical coupling was employed; instead direct electronic coupling was used from the ASCII character, addressed by the Cursor.

The use of the Optacon, interfaced in this manner, generated a great deal of interest in all the countries I visited

after leaving Holland, particularly in America and Canada.

Interfaced in the manner described, particularly as it produced a braille readout, its application in such occupations as word processing, computer programming, airline booking offices, in fact any organisation using visual display screens, opened an efficient and comparitively cheap employment avenue, particularly for those already possessing an Optacon. For those who did not possess an Optacon, such employment opportunities would also be almost immediately available, for no longer would the operators need to spend months learning the sighted print readout of the conventional Optacon.



D.2 Holland Rotterdam Blind Institute, Electronics Department. Optacon Interfaced with Prestel or a Computer - braille readout.

D.3 Heidelberg Stiftung Rehabilitation Centre. "Reading a VDU with an Optacon in the conventional manner."

7.3 <u>The Talking Optacon, Telesensory Systems Inc., U.S.A.</u> :
Whilst in America the following information was obtained concerning the Optacon with synthesised speech. At present there are only eight in the world, and at this stage Telesensory Systems had no immediate plans to produce the Talking Optacon commercially. The project to date had cost in the vicinity of one million U.S. dollars, but that is not to say that the Talking Optacon itself would cost that amount.

The Talking Optacon Speech Board was available, however, and was impressive. The cost was approximately $US3,500. When the operator was typing in characters so that the text was being sent without any complications - it was not a reading machine as such - the speech was quite good, but when using the TV camera it was prone, in my opinion, to stumble through the speech. Telesensory Systems were not happy with this aspect, and were considering changing the Optacon camera to something with a bigger array size. The present camera had an array of 24 x 6 elements, which Telesensory Systems felt was not big enough.

7.4 Talking Telephone Directory, Sensory Interface Equipment Inc., New York : During my visit to the Center for Independent Living in Louisville, Kentucky, I was able to witness a demonstration of the "Talking Telephone Directory" developed by Sensory Interface Equipment Inc. of New York.

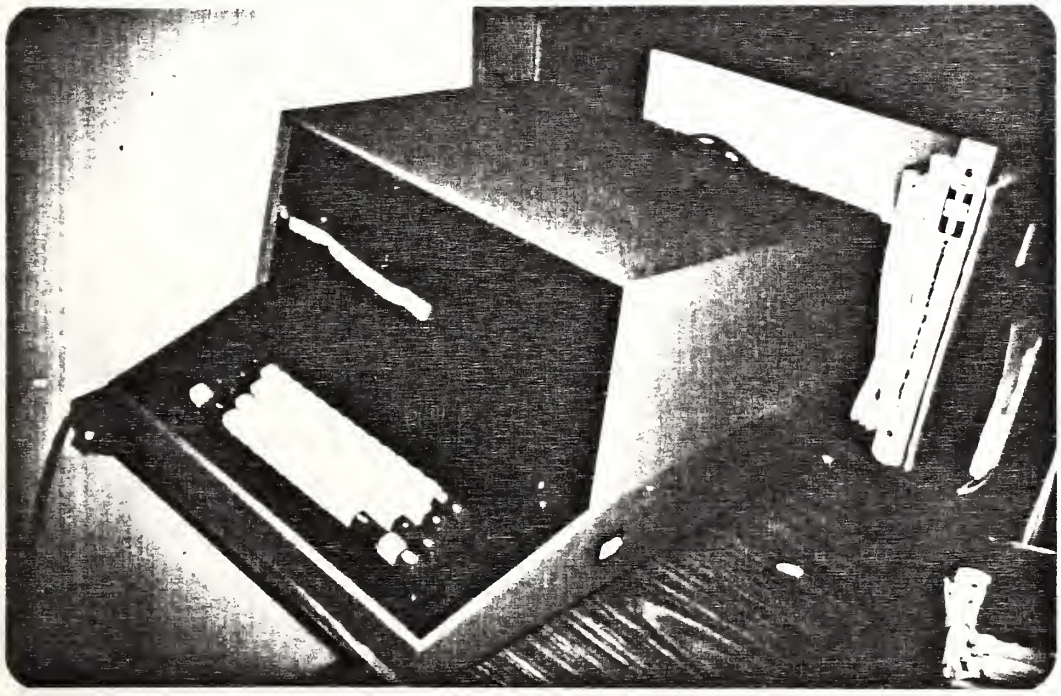
I was particularly interested in this equipment as I had received reports that it had a storage capacity of up to 5,000 telephone numbers and/or extensions. In past years blind and partially sighted telephonists had been offered positions with large commercial companies, only to find that these positions had to be declined due to the number of extensions involved. In each instance it was impractical to either braille the list or produce it in large print. Constant alterations, both additions and deletions, also contributed to the impracticality of using either braille or large print.

At the conclusion of the demonstration at Louisville I was fully satisfied as to the quality and clarity of the speech, and the rapid efficiency of the Directory. The user simply typed the business or person's proper name on a desk top keyboard. The small floor model computer then located and clearly recited the name and telephone number or numbers. If there was more than one listing under the same name, the computer asked for more information.

The particular system I saw demonstrated had a capacity of 5,000 entries, but this could be increased to 15,000 with a maximum of 30,000. The demonstration also showed how simple it was for listings to be added to, changed or deleted.

I found this equipment to be another excellent example of the application of electronic synthesised speech, enabling a blind or partially sighted telephonist to accept a position with any organisation regardless of the number of extensions involved. Hospitals could now become a viable employment prospect, whereas in the past they have had to be excluded because of the magnitude of required records and alterations which have to be updated daily due to the floating medical and patient input and output.

This directory could also be used in employment situations where extensive records information is an integral part of the office procedure, such as libraries, law offices (case records), and life assurance companies (rates, etc.).



D.4 Louisville, Kentucky, U.S.A.

Talking Telephone Directory.
(The master control keys at the front of the panel have been taped over, after being preset, for protection from interference by inexperienced personnel.)

7.5 <u>The Versabraille Interfaced with an Electric Typewriter, Holland, Sweden, Canada, U.S.A.</u> : This equipment was first demonstrated to me at the Rotterdam Institute for the Blind in Holland, and I found, as my study tour progressed, that it was used increasingly in various employment situations. In the U.S.A. it had an almost commonplace application as a "work aid". When interfaced with an electric typewriter it was particularly used for secretarial work, with dictation being taken in braille (Grade 1). An example of the work performed by the Versabraille is shown in D.5.

The time taken to record the dictation, and the production of the typed script was noticably faster, in my opinion, than the hitherto accepted audio-typing method. The confidentiality of the dictated brailled material was considered by some employers to be a security bonus, for it was pointed out that a stolen tape, when replayed on normal tape equipment, was indecipherable.

The Versabraille was used in ever-increasing numbers by tertiary students during lectures, tutorials and examinations, and to assist in the preparation of material for the final compilation of theses.

An author I met, who became blind in his early forties, found his Versabraille to be invaluable when interfaced with his electric typewriter. As he pointed out, "I managed to learn to write and slowly read Grade 1 braille, but was a shocking typist. Now I'm able to produce my typed script in a professional manner. Without this aid I'm sure I would never have written, let alone sold, another article or short story."

Before concluding this section on paperless braillers, mention must be made of the Braillex. Produced in Germany, it is used widely, as is the Versabraille, in European countries. Both devices are virtually identical in performance capabilities. The Braillex, however, has been designed with a larger capacity, for example :

Braillex - 700 pages of braille could be stored on a C-60 cassette, compared to
Versabraille - 400 pages.

Braillex - a capacity of 720,000 characters could be stored on a C-60 cassette, compared to
Versabraille - 400,000 characters.

Braillex - overall weight 18 kg., compared to
Versabraille - 4.5 kg.

Both these paperless braillers when interfaced with an electric typewriter are excellent examples of modern electronic advances. However, because of its minimal weight I personally found the Versabraille to be more suitable for general work applications.

D.5 Example of work performed by the Versabraille.

WORMALD
INTERNATIONAL SENSORY AIDS LIMITED
SUITE 1 ASCALON BUILDING
22A HUNTER STREET PARRAMATTA N.S.W. 2150
P.O. BOX 1015 PARRAMATTA N.S.W. 2150
TELEPHONE 633 4126 TELEX AA20387

Mr. John Doe,
1, Smith Street,
Sydney, N.S.W. 2151.

1st December 1981.

Dear Sir,

This is a letter showing the formatting capabilities of the Versabraille. The text of the letter was entered into the Versabraille via the braille keyboard, stored on cassette, edited and then printed on an Olympia ES 100 electronic typewriter. The typewriter that is capable of transmitting to and receiving information from the Versabraille. All formatting instructions, (line feed, carriage return, spacing, etc.) are stored on the cassette along with the text.

The characters that can be generated and recognised by the Versabraille are as follows:-

ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz

1234567890<=[-];., *"/$£_&'()>+?@:%.,

The Versabraille can be interfaced with a variety of communications devices, computers, word processors, hard copy braille embossers, and act in this mode as a terminal, etc.

The code used upon the cassette tape is digital, but is not audible. The control parameters are entered into a seperate chapter at the beginning of the tape and cannot be erased unless you specificly instruct the Versabraille to do so.

As a matter of interest it took the Versabraille and the typewriter just over two (2) minutes to print this letter, after the command to print had been given. The majority of this time is taken by the Versa -braille in accessing the tape.

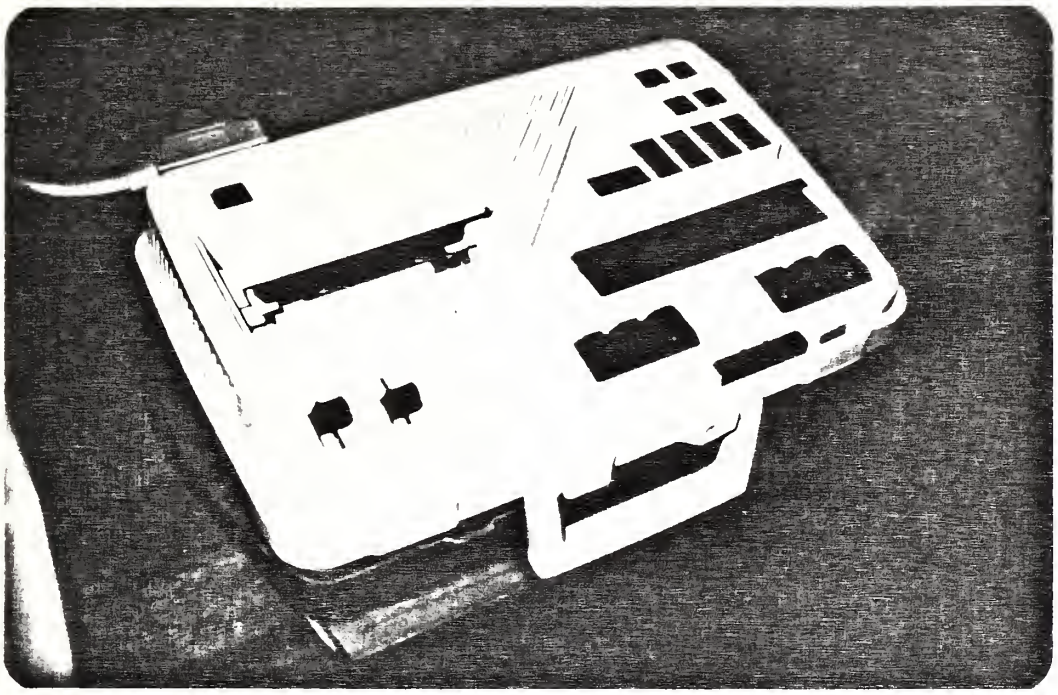
The Versabraille can also be used as a conventional tape recorder for recording sound, music, lectures, etc., but does not convert sound to braille, or vice-versa.

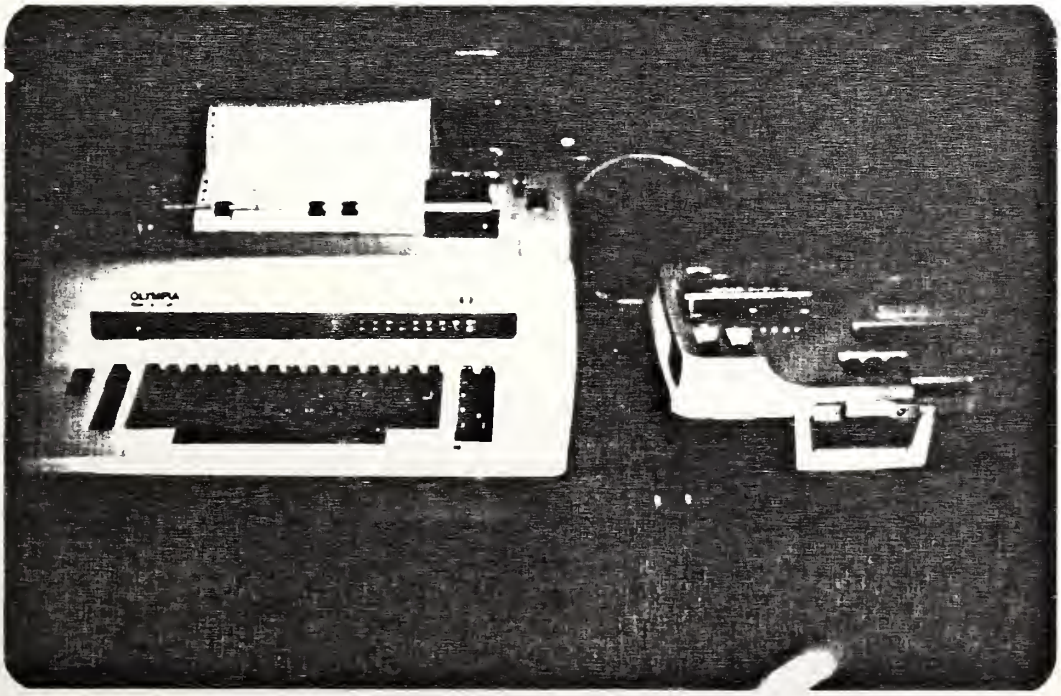
If you have any questions please contact me by telephone,
02 633-4126

Yours faithfully

N. Herring
Service Manager.

D.6 and D.7 Rotterdam Blind Institute, Holland.
Versabraille Interfaced with an Electric Typewriter.





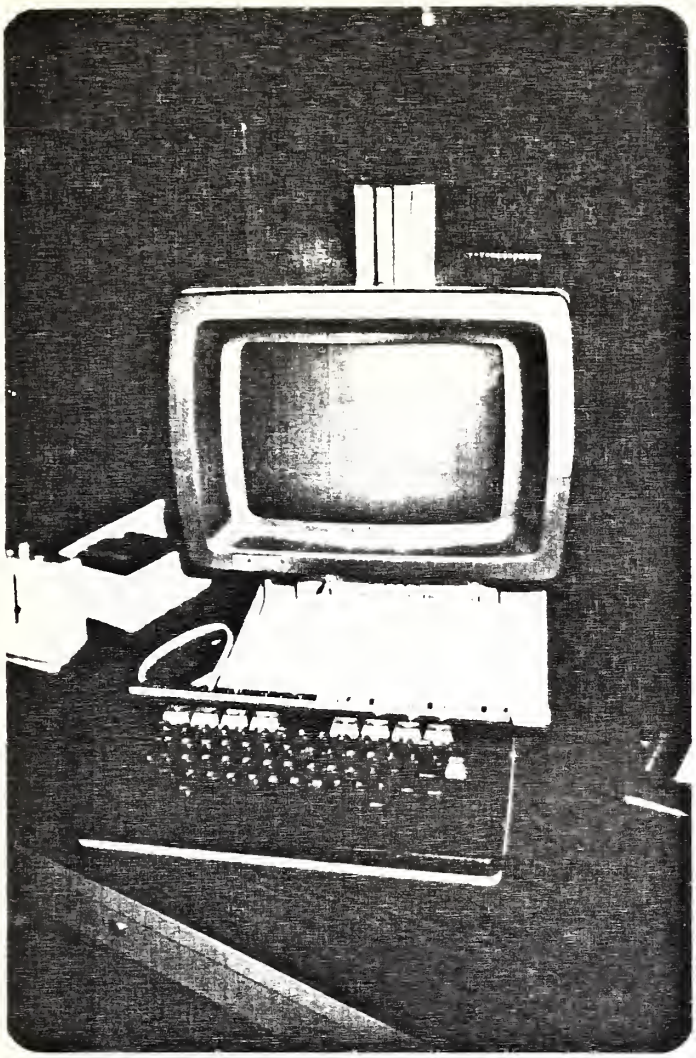
7.6 Maryland Computer with Full Synthesised Speech, Louisville, Kentucky, U.S.A. : During my visit to Louisville, Kentucky, I had the privilege of meeting with Dr. Tim Cranmer of the Bureau for the Blind, Frankfort, and Mr. Fred Gissoni of the Center for Independent Living. Our discussions of the latest developments in electronics for the blind were of great interest, particularly in the field of synthesised speech. Their demonstrations of equipment were, to say the least, a dramatic illustration of the rapid advances being made in this particular field. See sub-sections 7.4 and 7.5, Talking Telephone Directory and Versabraille.

As a finale to my visit, I was given a comprehensive demonstration of the Maryland Full Speech Computer Terminal. During the operation it was possible to listen to all transmitted or entered information, whether it was a page, a single line or a single word. The speech terminal was easily switched from full speech to spelled speech. I was informed that the speech rate could be increased by the blind operator from 45 words to in excess of 300 words per minute, and that the pitch, tone and volume were also likewise controllable.

During the demonstration a standard internal application form, already programmed, was loaded into the computer. This blank application form was transferred to and displayed on to the Maryland Speech Visual Display Terminal. As the client was interviewed, the blind interviewer was able to type into the terminal the personal details and relevant information required.

The application of full synthesised speech, such as the Votrax, as incorporated in the Maryland computer, etc., could open large numbers of new employment opportunities for the blind and partially sighted, such as computer programming, reservation services, law, word processing, information management, data entry and order processing.

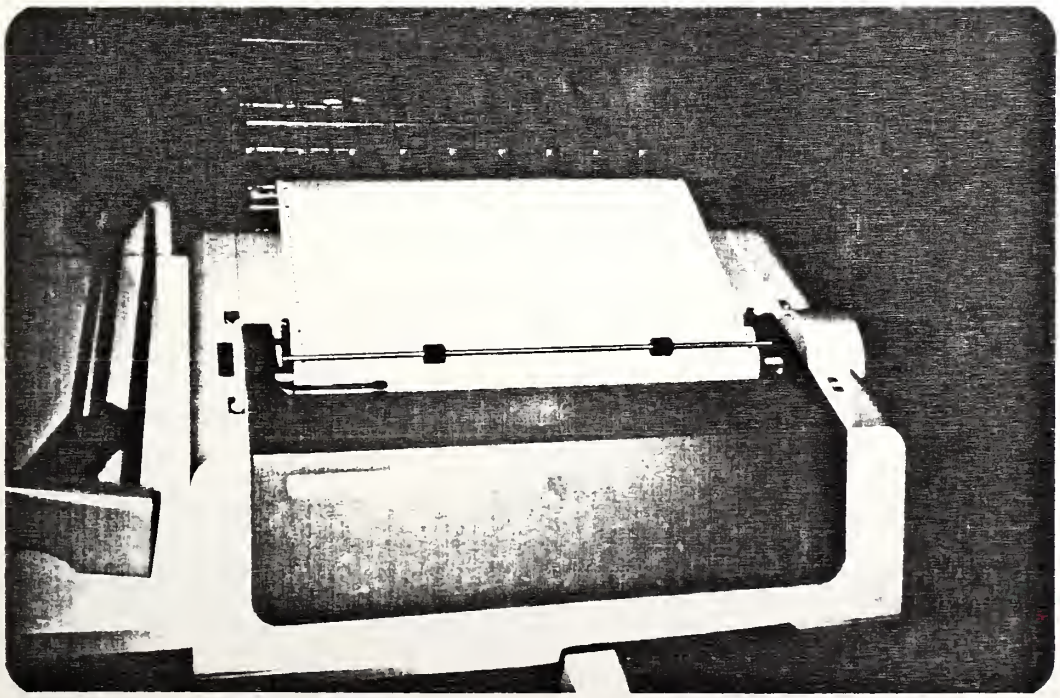
It is important to point out that not all of the larger computer installations have the RS 232 interface capacity (such as I.B.M., Honeywell, etc.).



D.8 Louisville, Kentucky.

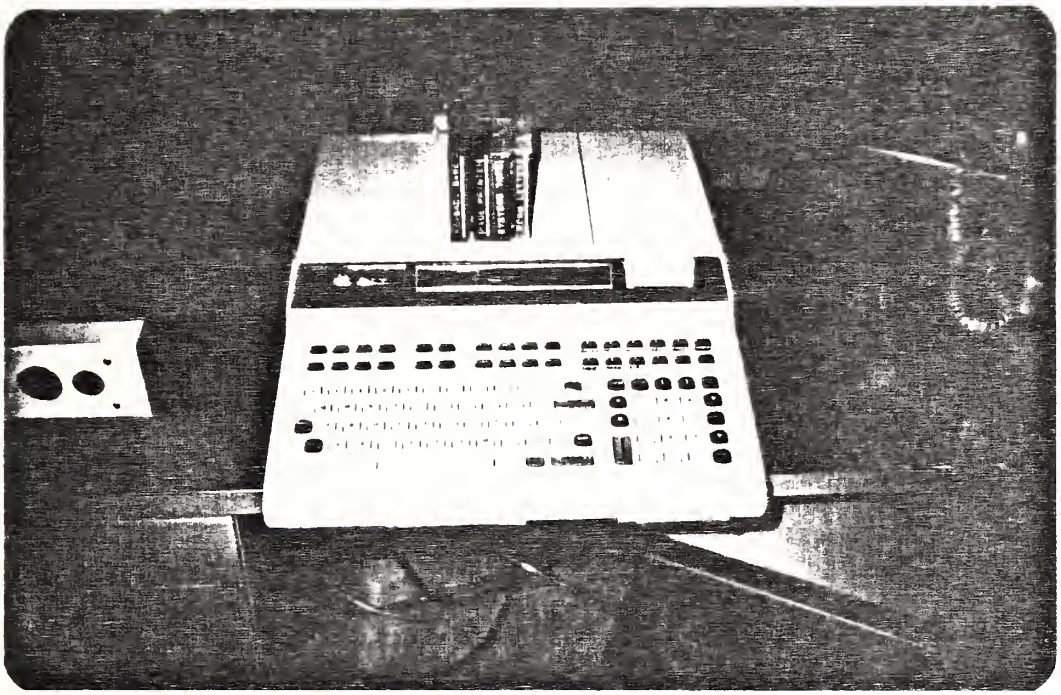
Maryland Synthesised Speech Computer.

Talking Visual Display Terminal.



D.9 Louisville, Kentucky.

Computer Printer.



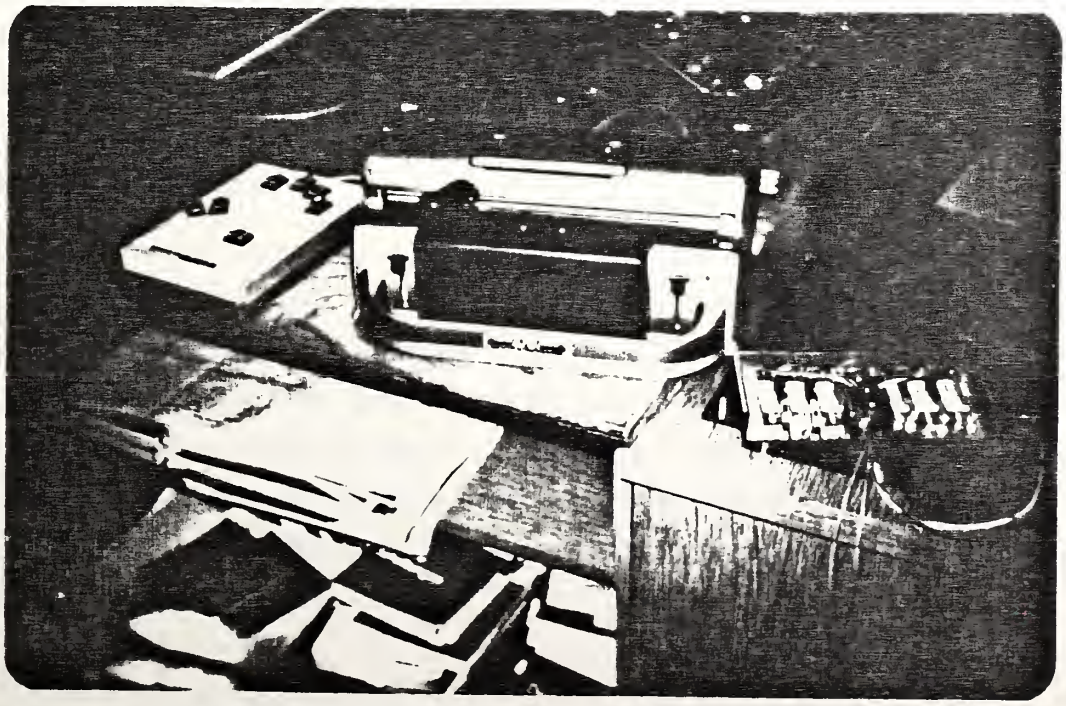
D.10 Louisville, Kentucky.
Maryland Computer.

7.7 Electric Perkins Brailler Interfaced to a Separate Keypad for a Disabled Blind Braillist (Stiftung Rehabilitation Centre, Heidelberg) : To me this development was a graphic example of electronic ingenuity. The concept was simple and extremely efficient, making it possible for a totally blind, multi-handicapped person to become a competent brailler. The client was only able to use one hand which was, unfortunately, malformed.

The specially designed brailling keypad was moulded to match the client's hand, with the six brailling keys placed in the positions which ensured maximum dexterity despite the physical limitations resulting from the client's disability.

In the photograph below (D.11) the specially designed brailling pad can be seen to the left of the electric Perkins brailler. The brailling pad was then interfaced with the Perkins. This interface can be clearly seen. To the right of the brailler a sample of the internal interface mechanism is displayed as a matter of general interest.

This excellent and very efficient electronic adaptation as an employment aid for a physically disabled, totally blind client was developed in the Electronics Department of the Stiftung Rehabilitation Centre, Heidelberg, Germany.



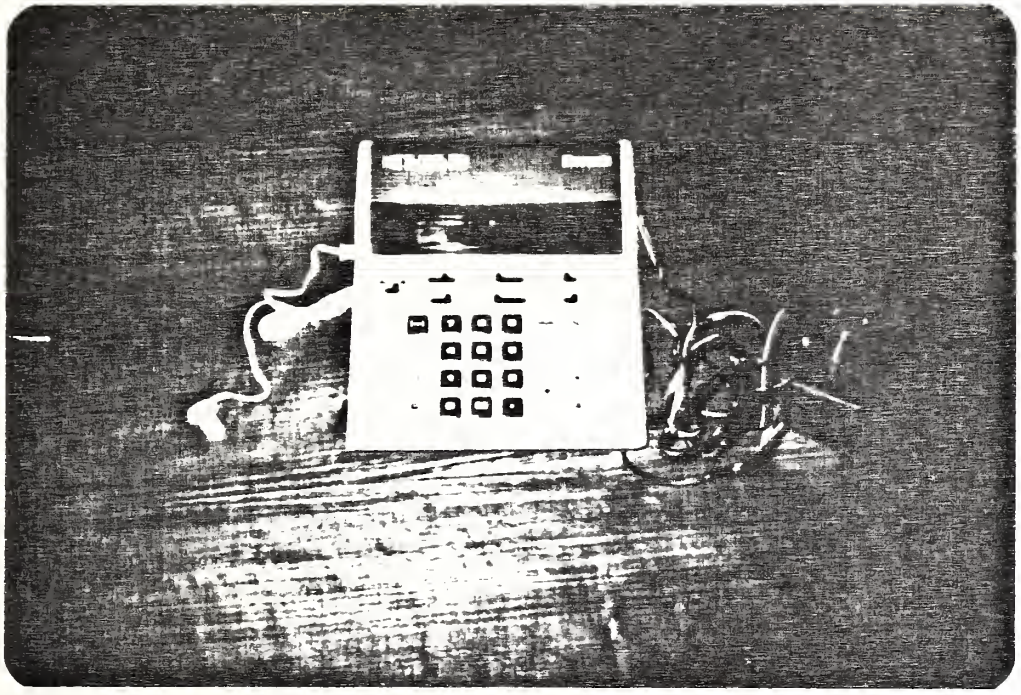
D.11 Heidelberg, Germany.
Electric Perkins Brailler Interfaced to a Separate Keypad.

7.8 National Panasonic Talking Calculator, American Foundation for the Blind, New York : Before leaving Australia interest had been shown by some of my blind colleagues in any form of calculator which would produce a brailled tape read-out of the items entered into the calculator. The "Speech +" by Telesensory Systems Inc. was introduced into Australia about five years ago, and although undoubtedly it was a great break through for the totally blind, its one shortcoming, according to remarks made by blind businessmen, was its inability to permit the blind user to "check" the entries if, for some reason, the spoken answer did not seem correct or logical.

Nowhere did I find any calculator which produced a taped read-out in braille. However, in Germany and Holland calculators were available equipped with a braille read-out replacing the visual LEDs (Light Emitting Diodes) read-out, thus allowing the blind user to check in braille each entry. No braille review, to my knowledge, was incorporated.

In New York at the American Foundation for the Blind I was shown the National Panasonic Talking Calculator, which, although it did not produce a braille read-out, was equipped with "review" facilities. This function permitted a blind user to listen to each entry stored in the calculator, with the result that a complete check could be made of every entry. The "review" could be repeated at will, until the calculation was finally cancelled or cleared.

In my opinion, this calculator, equipped with AC/DC, would be a great asset for any blind person, particularly those engaged in their own business, etc. It is light to carry, the speech (female synthesised speech) is excellent and, above all, its price is very reasonable. In New York it could be purchased for $US88. This calculator was not designed specifically for the blind and could be purchased at any large department store in New York.



D.12 New York.

National Panasonic Talking Calculator.

7.9 A.E.G.-Telefunken Desk Calculator, Amsterdam : This is a compact minds calculator for the visually handicapped which is capable of performing simple or extremely complex arithmatic or algebraic calculations with ease, and is also suitable for commercial work.

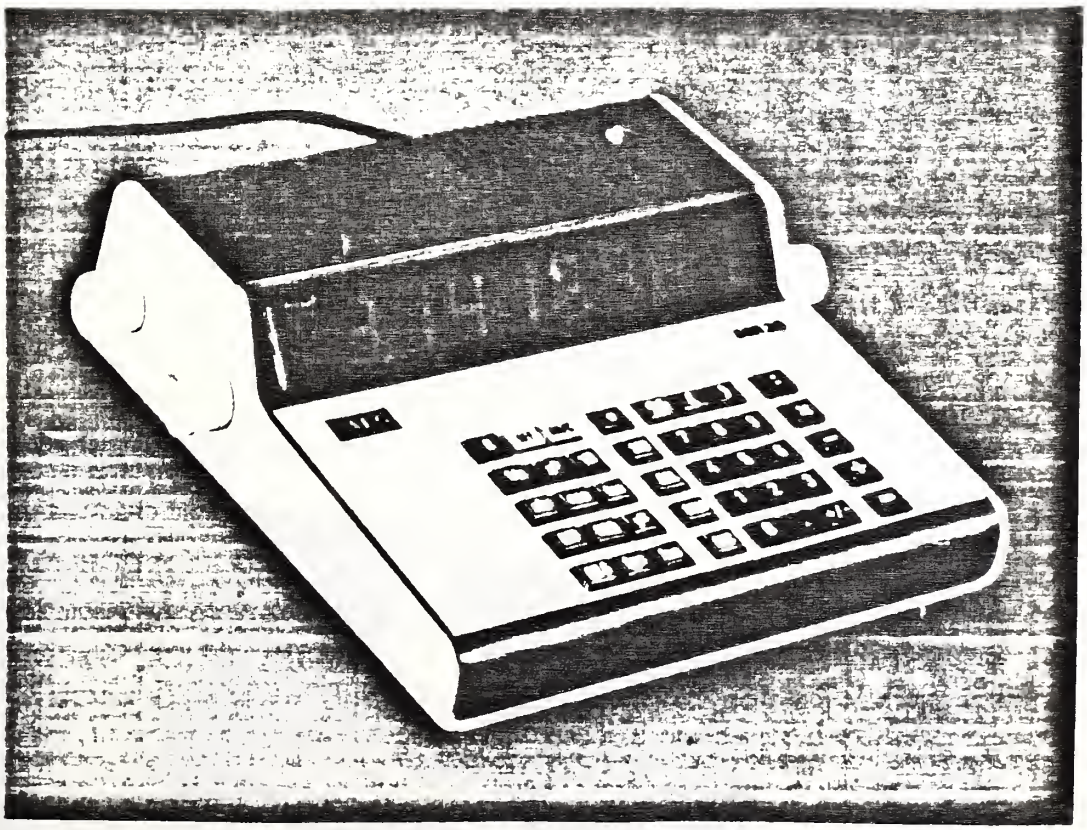
The keyboard is sub-divided for basic calculations, numerical display, memory functions and special functions.

The angle of the 20 mm. high, 9-digit LED display is adjustable and is screened against stray light by means of a Lamellen-filter. (This filter is similar to a domestic venetian blind.)

By means of the continuously variable brightness control and the variable angle of the display, between 30 and 60 degrees, the user can set the calculator to suit his or her individual needs.

The calculator provides 47 different functions. Some examples follow :

Arithmatic :	Addition, subtraction, multiplication, division.
Algebraic :	X to the power of 2, square root of X, reciprocal of X, Y to the power of X, Xth root of Y.
Trigonometry :	Sin, Cos, Tan, Arcsin, Arccos, Arctan, in both radiants or degrees.
Logarithms :	Natural log of X or log to the base 10X.
Exponential Functions :	E to the power of X, 10 to the power of X.
Percentages :	Percentages, adding percentages, subtracting percentages, multiplying by percentages, dividing by percentages.
Data Input :	Positive or negative numbers or the constant Pi.



D.13 Amsterdam.

A.E.G.-Telefunken Desk Calculator for the Visually Handicapped.

7.10 Omni Quartz Voicemaster Wrist Watch, American Foundation for the Blind, New York : The "Voicemaster" wrist watch was, like the National Panasonic calculator, not designed specifically for the blind, but for the general market, but its usefulness for the blind was immediately apparent.

The watch incorporated three features :

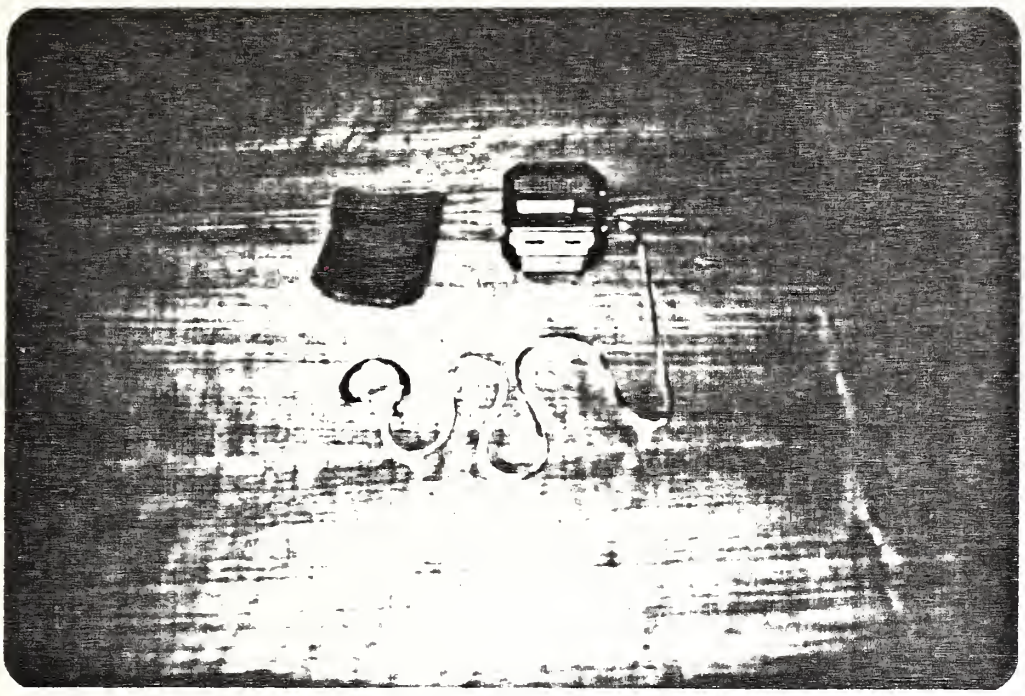
1. Normal time
2. Alarm
3. Stop watch with elapsed time over 5 minutes.

It was nicely presented and could be used in three ways :

1. As a wrist watch
2. As a pocket watch
3. As a bedside clock.

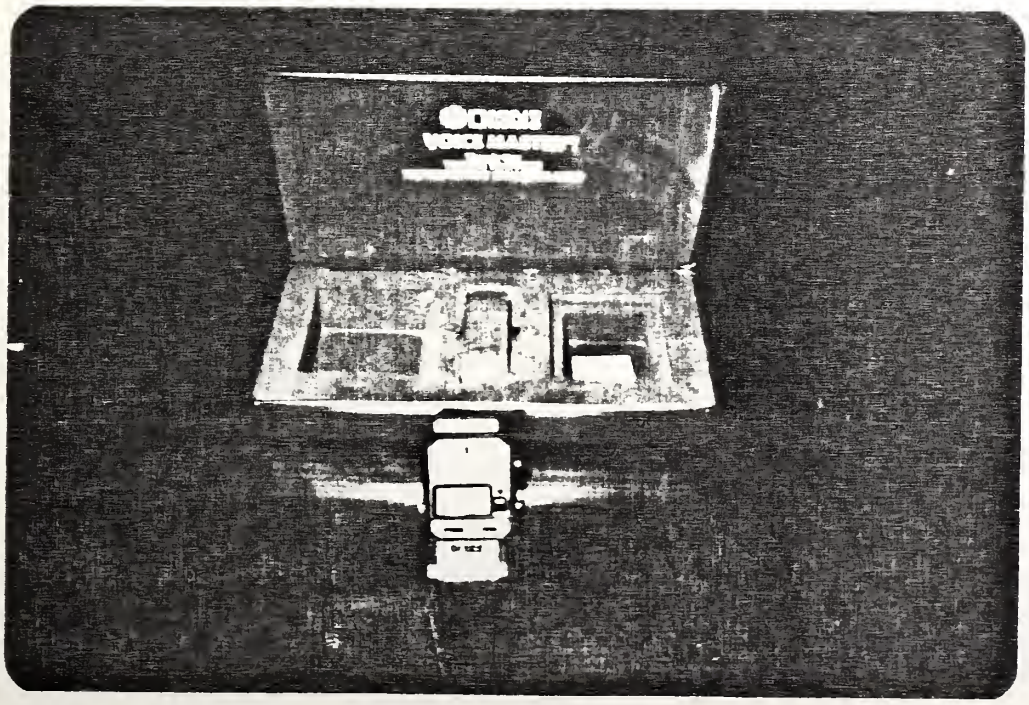
Although slightly larger than a conventional digital quartz wrist watch it is amazingly light. Personally I have found it very accurate, easy to set and ideal for general use. I feel sure that the stop watch facility would at last provide the blind telephonist with a simple solution for the timing of STD calls, which to date has been almost impossible.

D.14 New York
Omni Quartz Voicemaster Wrist Watch.



D.15 New York.

Omni Quartz Voicemaster as a Pocket Watch.



D.16 New York

Omni Quartz Voicemaster as a Bedside Clock.

7.11 Braille Composition Unit, Stiftung Rehabilitation Centre, Heidelberg : Of the three work-phases in the production of braille, i.e. text-input, text-editing and correction, text-reproduction, the Data-input-machine meets the requirements of phase 1.

This machine can write, correct and store one braille line at a time. The unit is available in two separate versions for blind and sighted transcribers.

The essential characteristics are :

Micro-processor-controlled.

Minimal keys through the utilisation of a command key.

The length of a line can be selected between 1 and 40 characters per line.

Size of a page from 1 to 40 lines per page.

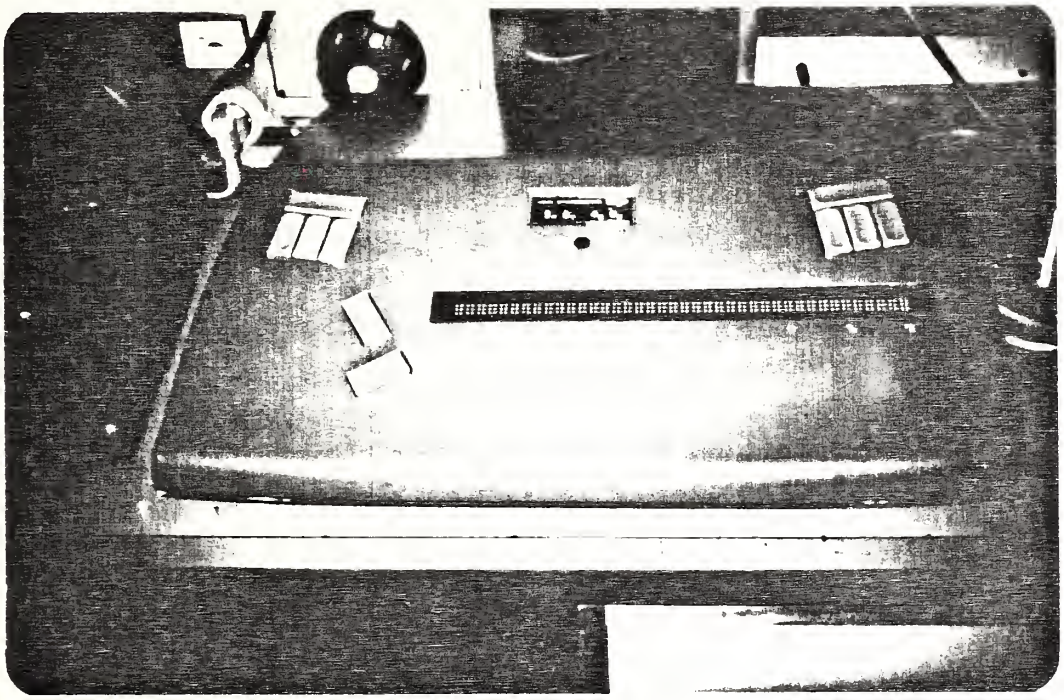
The last 5 characters/line, the last line/page and wrong operating commands are indicated by an audible signal.

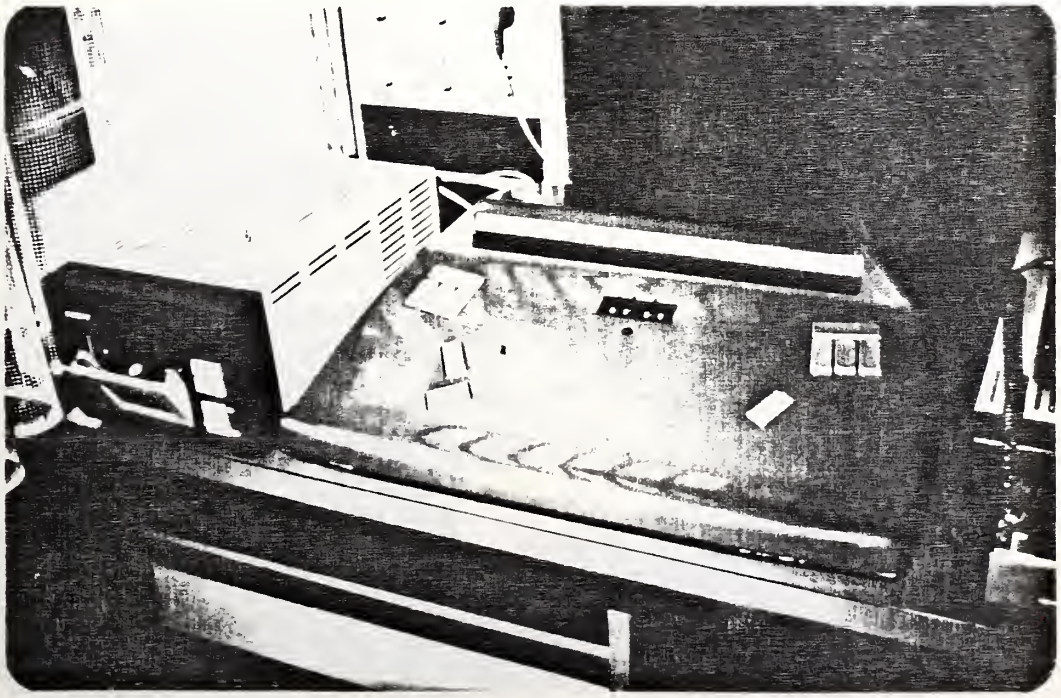
Optical/tactile display with maximal 40 characters.

Easy-to-operate and ergonimically designed keyboard.

By command indication of a line-number being used.

Output of the data on a 1/8" magnetic or paper-tape, via a standard interface.

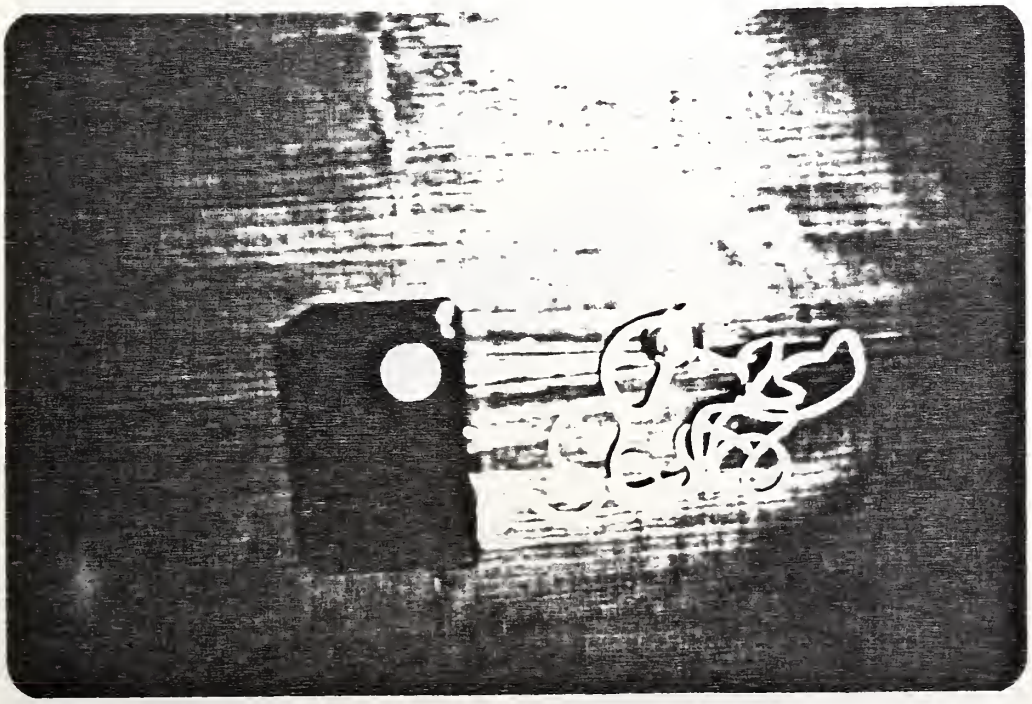




D.17 and D.18 Heidelberg
Braille Composition Unit.

7.12 Electronic Murmurator, Stockholm : This simple electronic device, aptly nicknamed "Whispering Box", was specifically designed to ensure that a visit to the movies could become as exciting, graphic and explicit for a blind person as his or her sighted companion, who was able to describe the action on the screen with the use of the Murmurator.

Basically, the Murmurator consists of a small leather case, which includes a standard earpiece. The leather case is fitted with an ultra-sensitive microphone, which permits the blind person's companion to whisper descriptions of the action on the screen during silent periods. So sensitive was the device that it was virtually impossible for patrons sitting alongside to hear the whispered description, even though it was perfectly audible to the blind patron through the earpiece.



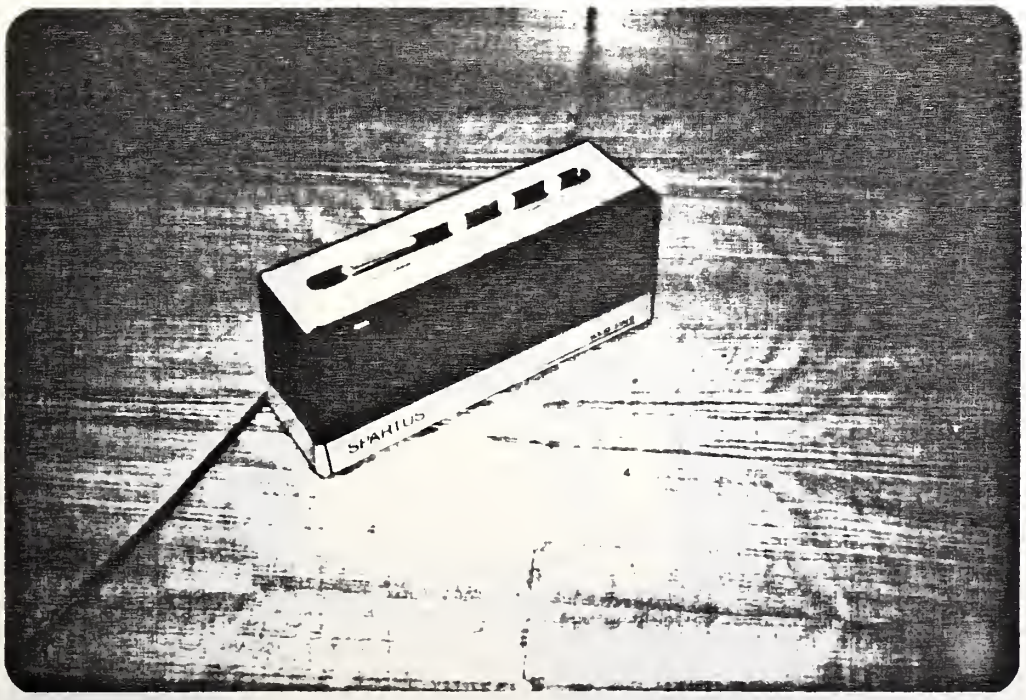
D.19 Stockholm.
Murmurator, or "Whispering Box".

7.13 <u>"Spartus" Large Digit Display Clock, Kentucky</u> :

This particular LED (Light Emitting Diode) alarm clock had the largest numeral display of any I saw during my study tour. Each numeral was 4.5 cm. (approx. 1¾ inches) high, and the clock was fitted with the following :

1. Snooze control.
2. Illuminator control (high or low) for LED display.
3. Time - fast or slow run.
4. Alarm - set - off - on.

In my opinion this clock would be ideally suited for use by the partially sighted, and could be very useful for the elderly blind, as all the controls had been designed and located to ensure simple operation.

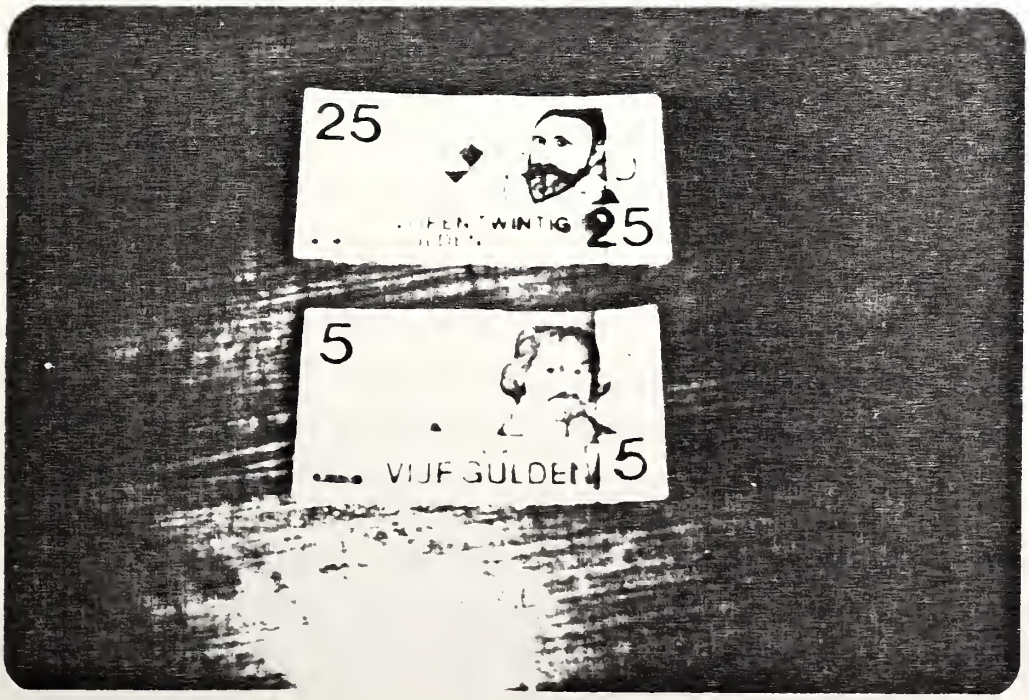


D.20 <u>Kentucky</u>.
"Spartus" Large Digit Display Clock.

7.14 Paper Currency, Holland, Israel, U.S.A. : I have included these notes on foreign paper currency as a matter of general interest. I feel that the Dutch authorities should be congratulated for their foresight in introducing their paper currency not only with the denomination of the notes shown in very large clear print for the partially sighted, but also brailled for the totally blind. In the photograph (D.21) the braille appears on the bottom left hand corner of the notes.

Israel also should be congratulated, for all their paper currency was also brailled in a similar manner, but owing to the nature of the paper it did not have a long period of durability.

It is also important to record that the Electronics Department of the American Foundation for the Blind had almost perfected a small device, approximately the size of a matchbox, which had a slot through which an American note could be passed. The device was able to immediately identify the note, translating the information to the user by means of synthesised speech, e.g. "Five Dollars", "Twenty Dollars", etc. This device, when perfected, would be invaluable to the blind of America, as, unlike Australian paper currency which are of different sizes, all American notes have the same dimensions.



D.21 Dutch Paper Currency.

SECTION 8. SUMMARY AND GENERAL CONCLUSIONS.

8.1 Throughout each phase of my study into the adaptation of switchboards and Telex equipment for use by blind and partially sighted operators my research convinced me that synthesised speech was the optimum solution in practically every avenue of employment which could conceivably be considered for blind and partially sighted employees in the clerical field.

My conclusions resulted from the following observations :-

(a) The equal suitability of synthesised speech for use by both the totally blind and partially sighted.

(b) The rapid introduction of products using synthesised speech designed, not specifically for the blind, but for the general public.

(c) The steady decrease in the price of synthesised speech-boards as competition for the general market increases between major American and Japanese manufacturers.

(d) The remarkable clarity of speech at present available with positive indications that future electronic developments will produce a far superior clarity of speech with a very high degree of audible comprehensibility.

In my opinion, synthesised speech must be introduced as soon as possible, preferably as portable, separate, interfacable units for the new Stored Programme Control P.A.B.X. switchboards, which are now rapidly being introduced by the seven major manufacturers supplying the Australian market. (See photographs E.1 to E.8.) If this work is not undertaken it is my opinion that employment opportunities for blind telephonists will rapidly decline and existing employment positions will be lost.

8.2 Much has yet to be done to broaden the scope of employment in the clerical field, particularly using synthesised speech and commercial typing, to prepare visually handicapped people for employment in situations where Visual Display Units are now becoming predominant.

8.3 Special Note : Whilst I believe synthesised speech is the complete answer for the adaptation of most job situations using Visual Display Units for blind and partially sighted

employees, I am also personally convinced that with the ever-increasing use of these units fully sighted operators will be asking - even insisting - that synthesised speech be incorporated in all major VDU installations. During my study tour I was amazed how often reference was made to complaints from sighted operators of eye strain, headaches, dizziness and even nausea which the operators directly attributed to working long hours with the VDUs. Whether these claims will be substantiated medically remains to be seen, but to date medical opinion expressed to me did not dismiss such a possibility.

8.4 It is important to develop our own Electronics Department where, with qualified staff, research could be carried out to ensure that, with the rapid growth and introduction of electronics in the commercial field, opportunities for the employment of the blind and partially sighted would increase rather than decline, as is the case in the industrial field in overseas countries. Regrettably, in this latter field the only employment available was basic assembly work in a sheltered workshop or institutional situation.

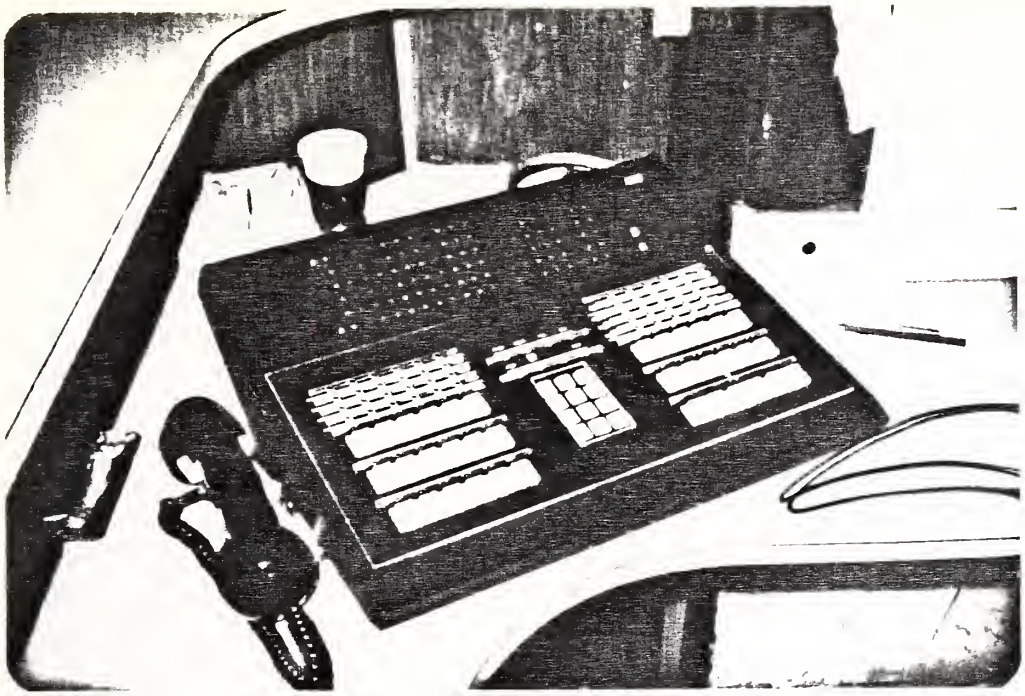
8.5 In the writer's view the introduction of Low Vision Training Schools, such as described in Section 6, should be introduced as soon as possible, thus creating an educational facility which would assist clients and tertiary students with partial sight to achieve a greater degree of "reading" ability thus reducing stress and consequently vastly improving their employment prospects.

8.6 No matter which country I visited great interest was shown in photographs illustrating the extent of our telephonist training facilities and teaching methods. In every instance I was asked for comprehensive information regarding our work in Australia, particularly in the switchboard training field incorporating training traffic simulators, as no other country had such extensive sophisticated equipment.

8.7 Finally, I would again like to express my gratitude to the Winston Churchill Memorial Trust for granting me the opportunity to undertake such an extensive world study tour. To my "anonymous donor" and to the Royal Victorian Institute for the Blind I will always be exceedingly grateful for providing the additional finance to allow Mr. Rex Fielding of Telecom Australia to accompany me, for without such invaluable assistance a study tour of this magnitude would not have been possible due to my visual impairment.

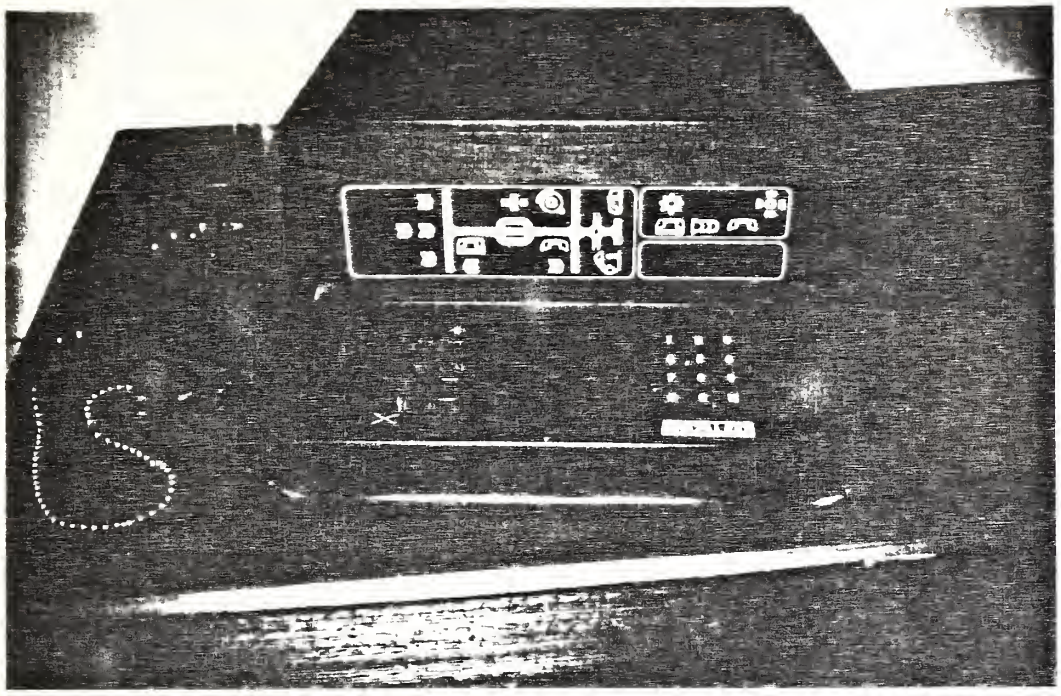
E.1 Philips Industries P.A.B.X. Switchboard, D1200 Series.

E.2 Philips Industries P.A.B.X. Switchboard, D1200 Series with hood for visual display area.

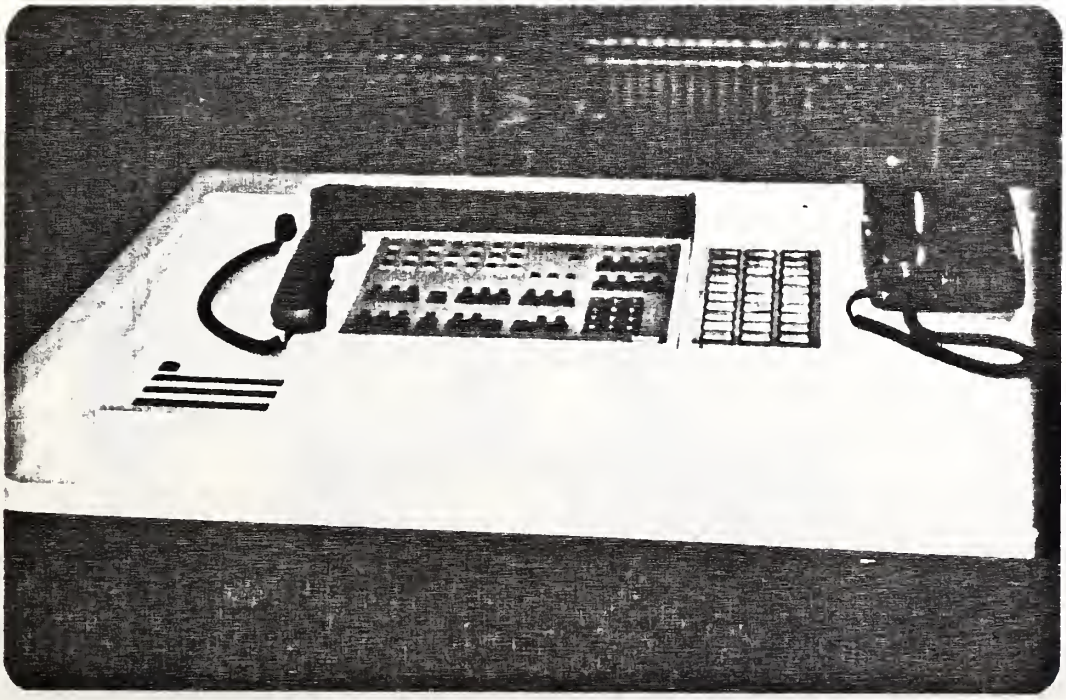


E.3 N.E.C. Australia : N.E.A.X. Stored Programme Control P.A.B.X. Switchboard with blind operator overlay.

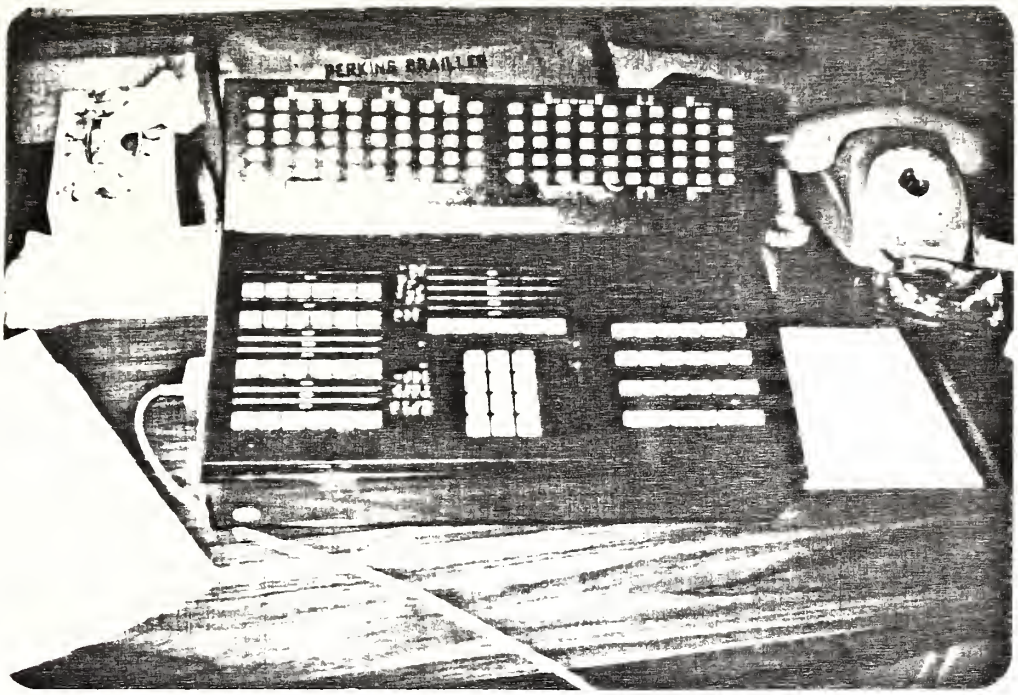
E.4 N.E.C. Australia : N.E.A.X. Stored Programme Control P.A.B.X. Switchboard without overlay.



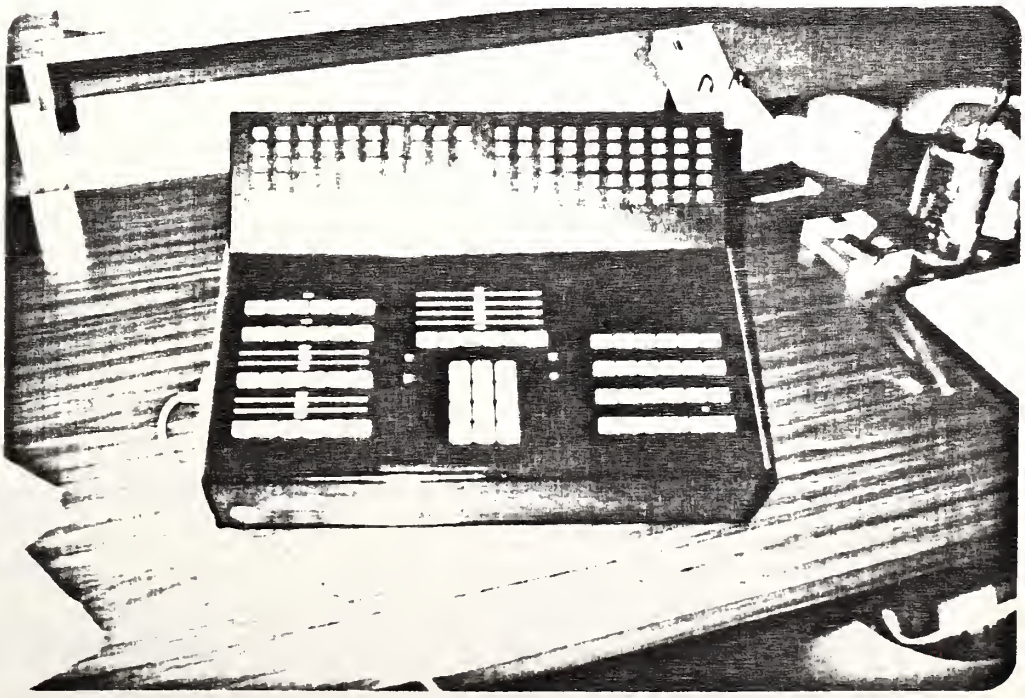
E.5 L.M. Ericsson Stored Programme Control P.A.B.X. Switchboard, ASB 100.



E.6 Siemens Industries EMS Stored Programme Control P.A.B.X. Switchboard with braille tactile readout of VDU screen.



E.7 A.W.A. Dimension 400 Stored Programme Control P.A.B.X. Blind Operator's position.



E.8 A.W.A. Dimension 400 Stored Programme Control P.A.B.X. Sighted Operator's position.

APPENDIX I. ORGANISATIONS AND COUNTRIES VISITED.

Israel	
Ministry of Labor and Social Affairs	10 Yad Harutzim Street, Talpiyot, Jerusalem.
Israeli-American Lighthouse	Migdal or Kiryat Haim, Haifa.
Italy	
Unione Italiana Dei Ciechi	Sede Centrale, via Borgognona 38 00187, Rome.
Banco D'Italio	Rome.
Construziono Elettromeccaniche Telefoniche (COELTE)	24032 Caloziocorte, Bergamo.
Germany	
Siemens A.G.	U.B.K. T.E., Hoffmannstrasse No. 51 8000, Munich.
Stiftung Rehabilitation Centre	P.O. Box 101409, Heidelberg.
France	
Sagem	Rue Ancelle 92521, Neuilly, Paris.
Holland	
Vereniging Het Nederlandse Blindenwezen	Kipstraat 54 - 3011 RT, Rotterdam.
Philips Electronic Industries	Gloeilampsabrieken N.V., Eindhoven.
Sweden	
Synskadades Riksforbund	S - 122 88, Enskede, Stockholm.
The Swedish Telecommunications Administration	Farsta, Stockholm.
Low Vision School	Sabbatsberg Hospital, Stockholm.
M.G. Elektronik	Fogdevagan 40, 12158 Johanneshov, 08/494477, Stockholm.
England	
Royal National Institute for the Blind	244 Great Portland Street, London, W.1.
British Telecom	1 Swan Lane, Upper Thames Street, London, E.C.2.
English Speaking Union	Dartmouth House, 37 Charles St., Berkeley Square, London.
Barclays Bank Limited	Britannia House, 16/17 Old Bailey, London.

England (contd.)	
Birmingham University	Sellywick House, 69 Sellywick Road, Edgbaston, Birmingham.
Plessey Communications and Data Systems Ltd.	Abbeyfield Road, Lenton Industrial Estate (West), Nottingham, N.G.7.2SZ.
B.B.C.	London
Midland Bank	33 Tachbrook Street, London SW.1.
Chartwell	Westerham, Kent, T.N.16.10S.
Canada	
The Canadian National Institute for the Blind	1929 Bayview Avenue, Toronto, Ontario.
Northern Telecom	Belleville
Mitel Corporation	350 Leggett Drive, Kanata, Ontario.
General Foods Processing Inc.	Cobourg.
Quebec Institute for the Blind	Quebec.
The Bell Corporation	Toronto.
U.S.A.	
Science for the Blind	221 Rock Hill Road, Bala Cynwd, 19004, Pa.
New York Association for the Blind	111 East 59th Street, New York, 10022.
The American Foundation for the Blind	15 West 16th Street, New York.
University of Louisville	Louisville, Kentucky.
The Bureau for the Blind	State Office Building Annex, Frankfort, Kentucky.
Rolm Corporation	4900 Old Ironside Drive, Santa Clara, Calif.

APPENDIX II. HEADS OF DEPARTMENTS AND PERSONALITIES CONTACTED.

Mr. Nathan Dickstein	National Supervisor, Ministry of Labor and Social Affairs, Jerusalem.
Mr. Shlomo Triestman	Ministry of Labor and Social Affairs, Jerusalem.
Mrs. Dina Saphroni	Executive Director, Israeli-American Lighthouse, Haifa.
Dr. Roberto Kervin	President, Unione Italiana Dei Ciechi, Rome.
Mr. Paola and Miss Daniela Antozzi	COELTE, Bergamo.
Dr. M. Huber	Siemens A.G., Munich.
Mr. M. Harres	Stiftung Rehabilitation, Heidelberg.
Mr. Rene Mirouze	Sagem, Neuilly.
Mr. Leo Van Noorden	Vereniging Het Nederlandse Blindenwezen, Rotterdam.
Mrs. R. Kool	Public Relations Officer, Philips Electronic Industries, Eindhoven.
Mr. P.A.N. Broekmans	Philips Electronic Industries, Eindhoven.
Mr. Anders Arnor	Head International Relations Dept., Synskadades Riksforbund, Enskede.
Mr. Jan Ingvar Lindstrom	" " "
Mr. Krister Inde	" " "
Mr. Barry Hampshire	" " "
Mr. Ulf Backstrom	Swedish Telecommunications Administration, Farsta.
Mr. Bengt Ljungros	" " "
Mr. Kurt Tell	" " "
Mrs. Eva Hagermalm	Low Vision Clinic, Stockholm.
Mr. Michael Grimslans	M.C. Elektronik. Stockholm
Miss Gillian Paschkes	Publicity Assistant, Royal National Institute for the Blind, London.
Mrs. A. Dobbs	R.N.I.B., London
Mr. John Fitzgerald	" "
Mr. Peter Van Beine	" "
Mr. M.J. Haggerty	British Telecom, London.
Mrs. Sheila Levins	Communications Section, Barclays Bank Ltd., London.

Dr. M. Tobin	University of Birmingham.
Mr. R.A. Dando	Digital Switching Systems Division, Plessey Communications and Data Systems Ltd., Nottingham.
Mr. Rawlingson	Midland Bank, London.
Mr. Allen Nokes	British Telephonists Association, London.
Mrs. D.J. Broome	Chartwell.
Mr. Eric Tucker	British Airways (ret.)
Mr. Robert Storey	Director, International Services, Canadian National Institute for the Blind.
Mr. Hugh Russell	Canadian National Institute for the Blind.
Mr. Gordon Griffiths	" " "
Mr. M. Daniels	Manager, Mitel Corporation.
Miss Cathy Snary	Bell Corporation.
Mr. W. Sprague	Executive Director, New York Association for the Blind.
Mrs. Arlene Gordon	New York Association for the Blind.
Mr. Eric Arsenicos	" " "
Mr. Neil Crouse	" " "
Dr. Lawrence Miller	" " "
Mr. Elliott Waxman	The Queens Lighthouse, Elmhurst, N.Y.
Dr. T. Cranmer	Bureau for the Blind, Frankfort.
Mr. F. Grissoni	Center for Independent Living, Kentucky.
Mr. Sam Negrin	American Foundation for the Blind, New York.
Mrs. Sandy Carse	International Development, Rolm Corporation, Santa Clara, Calif.
Mrs. Tina Rinella	" " "
Mrs. Maria Biggs	" " "
Dr. T.A. Benham	Science for the Blind, Pennsylvania.

APPENDIX III. TELEVISION MAGNIFIER, (Philips, Holland) :

Philips television magnifier

A NEW AID FOR THE VISUALLY HANDICAPPED

Magnifying glasses which can be a useful aid in reading normal texts are commercially available for the visually handicapped. Most of these magnifying glasses give a magnification of approximately 2 x. If a much larger magnification factor is required, this can no longer be achieved with an ordinary magnifying glass, if only because the field of view becomes too small, the position of the eyes too critical and the brightness too low.

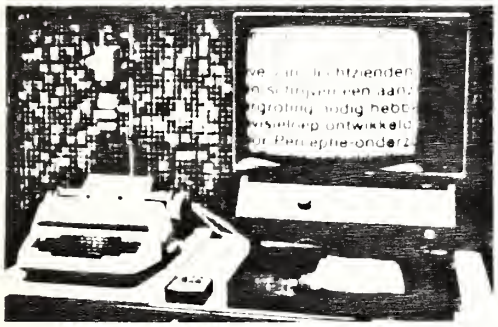
The Philips television magnifier has been developed by the Institute for Perception Research in Eindhoven for people with poor eyesight who need a significantly higher magnification for reading and writing. The experience and advice of a number of visually handicapped people were used in the development work.

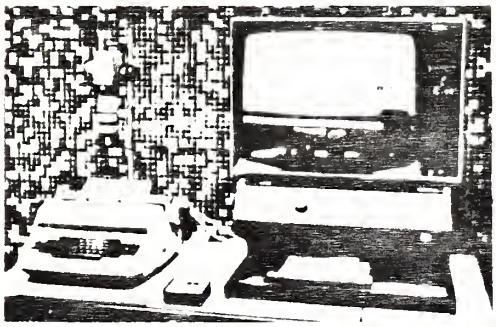
Basically, the Philips television magnifier consists of a television monitor, a television camera and a platform on which the object to be magnified can be moved smoothly in all directions.

The horizontally mounted camera picks up the picture and projects the image on the screen via a mirror. By using an electrically operated zoom lens the desired magnification factor can be adjusted continuously and smoothly. The television magnifier is designed as a table model which can be used quite normally in the living room on an ordinary table.
The television camera is mounted in a closed cabinet which also carries the television monitor.

The mat-black platform can be moved forwards or backwards continuously; it carries a removable platform with text which can be moved smoothly to and fro in the direction of reading. The text platform can be removed to give a writing surface with a free space of 14.5 cm above it.
The slow-running zoom lens is operated by pressing a button. This permits the magnification to be amplified or reduced between three and twenty four times. The television monitor gives a very good picture, even if the text is moved during reading.

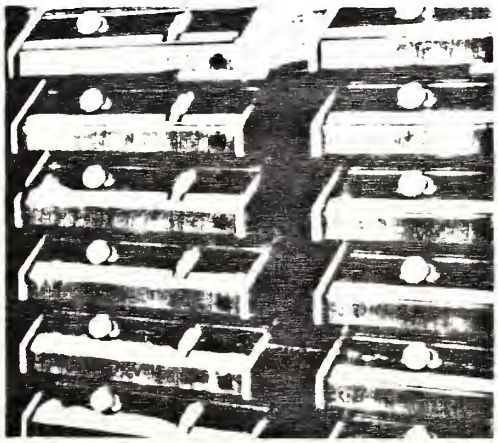
The system has a facility for reversing the contrast of the image, which increases the legibility for a certain category of visually handicapped persons (a text displayed on the screen is normally white on a black background). The lighting is screened and is limited to the plane on which the text to be read has to lie. Although the position of the eyes is not very critical, it is advisable to place the Philips television magnifier on a table top which is 68 cm high to ensure a comfortable posture for reading and writing.

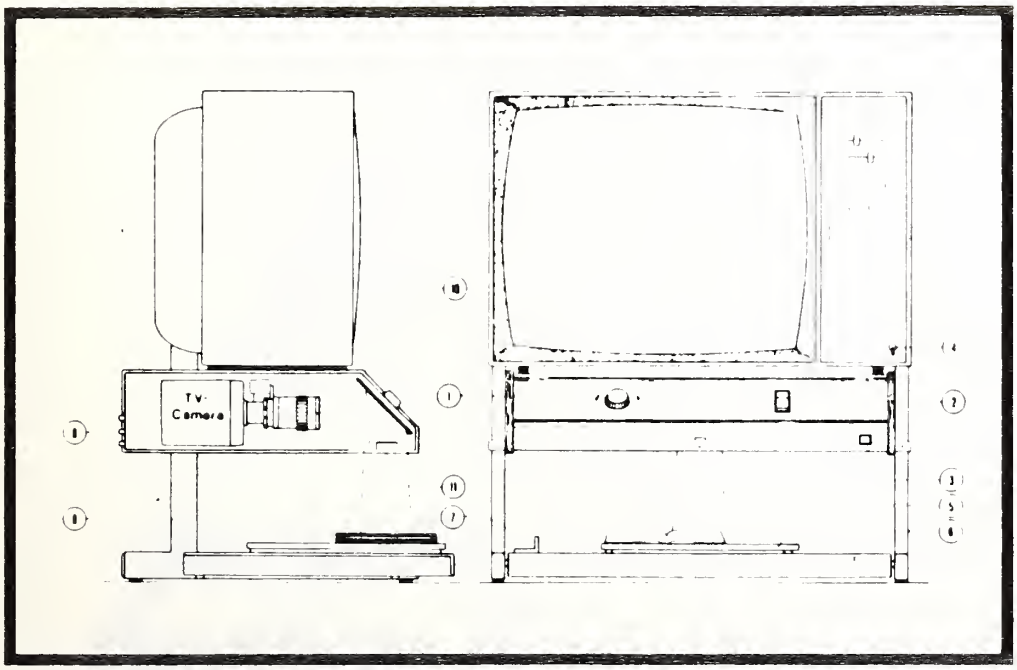




The television magnifier as a system
With the addition of a second television camera, a switchboard and a special stand, the television magnifier forms a system permitting various applications. Typists with poor eyesight have difficulty in reading the copy to be typed. If the copy is placed under the television magnifier it can be easily read while touch typing. If a typing error is made, the typist switches over to the second television camera via a switchboard to display the typed text on the monitor screen and permit correction.
This is a system which gives a visually handicapped typist a greater degree of independence.
The system also makes it possible to show small objects in enlarged form on the monitor screen – for example, in teaching situations.

The television magnifier: a series product
After a long development phase and extensive testing in practice, the Philips television magnifier has become a series product. This method of production ensures constant quality and the lowest possible price.





Controls

1 Distance setting knob
2 Magnification button
3 Mains switch
4 Contrast reversal switch
5 Removable text platform
6. Sliding platform
7 Adjustable stop
8 External connection
9 Table stand with two height settings
10. Mirror
11 Text platform light

Specification

Television monitor	61 cm picture tube, fitted with contrast reversal switch
Television camera	Fitted with electrically operated zoom lens; magnification from 3 to 24 times
Lighting	By two low-voltage lamps
Focusing	With rotary knob
Electrical connection	With a plug and central switch
Sliding platform	Maximum travel 350 mm in the direction of the line, perpendicular to this, 280 mm, adjustable left-side line stop
Dimensions	Height 790 mm Width 650 mm Depth 420 mm
Connections	Monitor and extra socket
Recommended table top height	680 mm

Further information available from

Data subject to change without notice

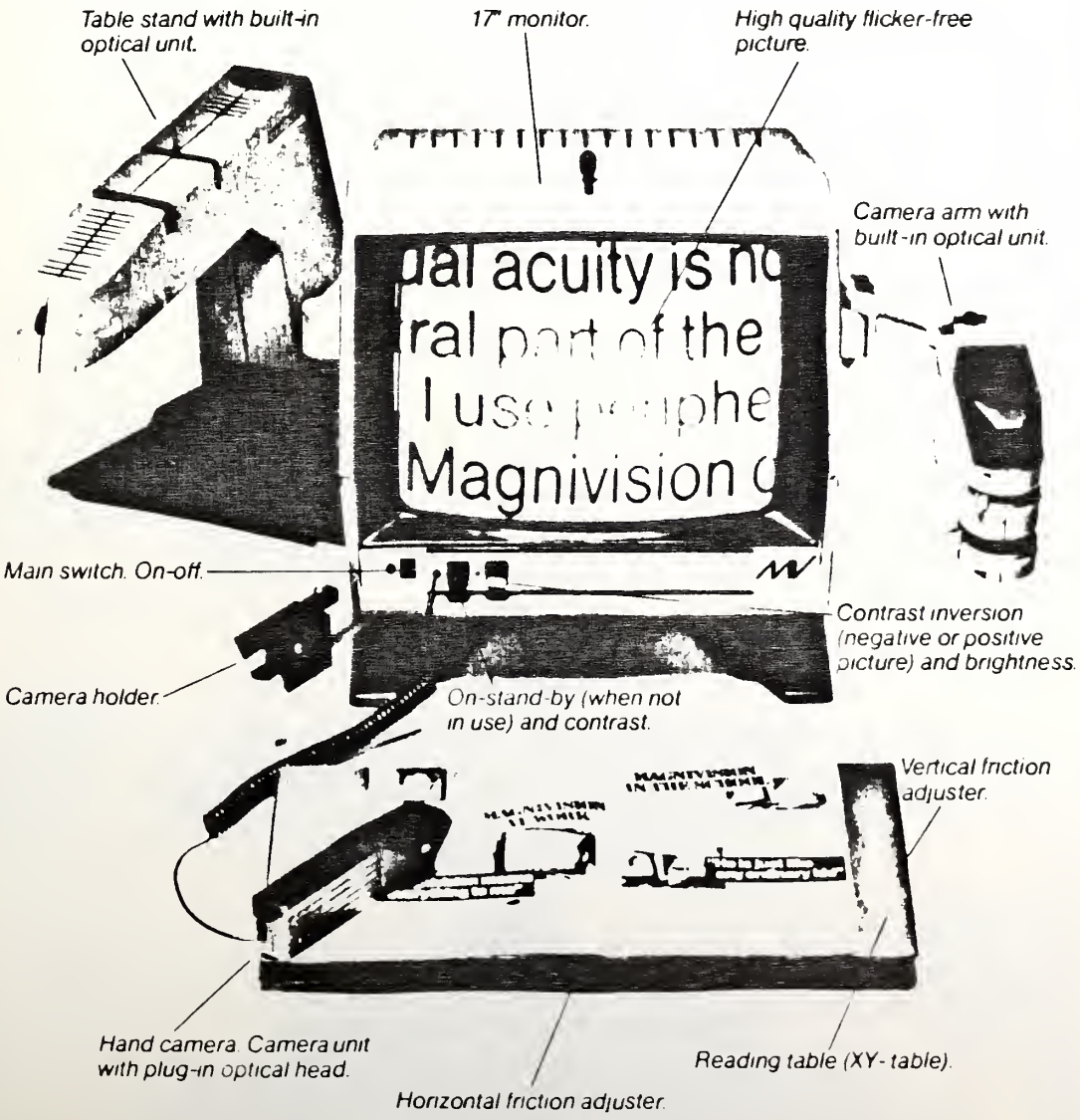
3150 32 1001 31

APPENDIX IV. MAGNIVISION, (Sweden):

Visually impaired persons helped us develop Magnivision. The most flexible CCTV in the world.

CCTV stands for Closed Circuit TV. Developed to enable visually impaired persons to read, write and to do many other things. ElektronOptik developed Magnivision. A high quality system that is the only one in use in Sweden. And now, too, in many other countries. Here you will learn all about Magnivision and how it works. And we will tell you about our reasons for wanting you to have one.

No other CCTV gives you more flexibility.



In developing Magnivision we consulted our V.I.P's.* And we took notice of what they told us.

1.

THE MODULAR CAMERA SYSTEM.

Magnivision provided the conventional CCTV system with a mobile eye – the hand camera. This high-quality camera enables the user to read for hours. The camera unit can also be used in the camera arm, the table stand and other specially designed optical systems.

2.

THE HIGH-QUALITY FLICKER-FREE PICTURE.

A flicker-free picture is a prerequisite.
Adjustable contrast and luminance are also necessary and for V.I.P's the picture on a CCTV must be better than on a normal TV-set. Magnivision possesses all these features. We have compared it with other systems and know that our efforts have been successful.

3.

THE COMPACT AND NON-TIRING SYSTEM.

No part is intended to be used for any other purpose
Magnivision will fit in with your home's decor like an ordinary every-day TV-set. At work it looks just like a normal computer terminal.
And does not seem strange or awkward
We also know that Magnivision will not harm the eyes.

4.

THE FLEXIBLE MODULAR SYSTEM.

Magnivision comes in several versions
The camera can be placed in the position most suited to individual needs. And there are specially designed Magnivision systems. Home Magnivision. School Magnivision. Work Magnivision.
And we are constantly developing a wider range of accessories.

**V.I.P. = Visually Impaired Persons.*

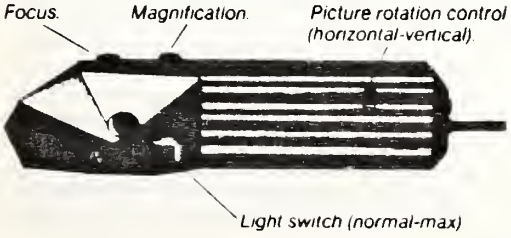
With the hand camera you can do more than just read.
Railway Photographers H.C. CASSERLEY
Think
Farmhouses
AUBY
intain balance a
After
and

The camera unit has many possibilities.

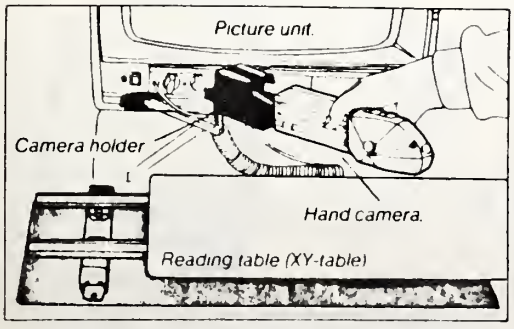
HAND CAMERA.

The Magnivision camera unit can be fitted with an optical head which is easily attached to the camera. It can be used with the left or right hand. This light-weight hand camera is easy to use and provides a multitude of possibilities.

All the hand camera controls are easy to operate. And after just a few minutes practice you'll be able to operate this camera. You can allow it to range widely over most of your desk or along the shelves beside you. And it can be held at any angle since a picture rotation control on the camera helps you to keep the image horizontal on the screen.

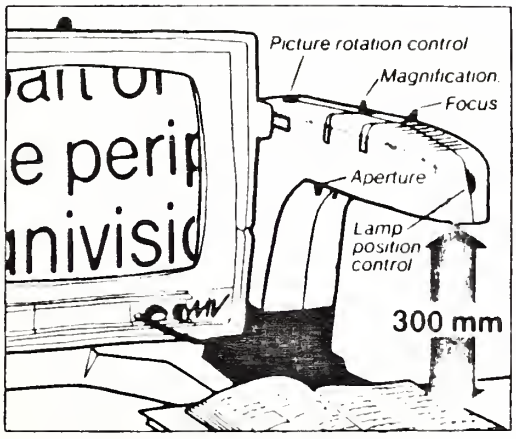


CAMERA HOLDER.



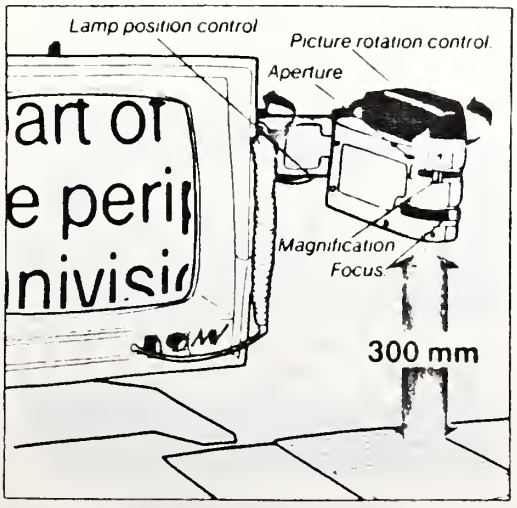
If you wish to have both hands free the hand camera can easily be fitted into a holder which is attached under the monitor on the right- or left-hand side. You read by moving the "XY-table" under the hand camera from right to left. Whenever you change to the next line of text the "XY-table" will click to indicate this. Should the hand camera be mounted in its holder extra light must be provided to obtain the best possible Magnivision picture.

TABLE STAND.



The camera unit can be fitted into a table stand equipped with a high-quality optical unit and controls. This table stand can be placed on either side of the monitor and used in conjunction with the XY-table. The table stand camera also provides a remarkable depth of field.

CAMERA ARM.



The camera unit can also be placed in a camera arm, attached to a bracket on either side of the monitor, which can be moved through almost 270°. It is often used to view pictures, drawings or other objects. Its remarkably large depth of field allows you to read thick books or use mechanical tools under the camera arm without needing to alter the focus. You can also, of course, read with the help of the XY-table.

The picture must be bette

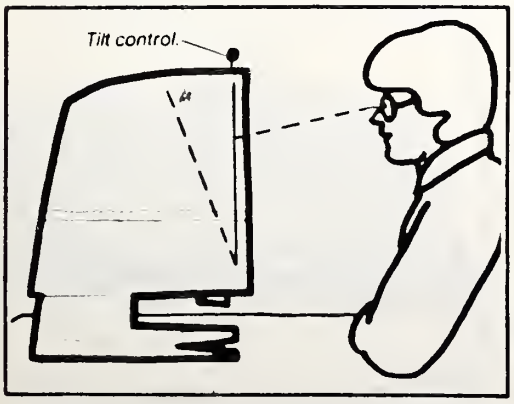
WILL IT HARM YOUR EYES?

Using a CCTV system will not harm your eyes. Not even if you sit close to the monitor for several hours. But for you to do so, it is essential to have an extremely clear and sharp picture. With good contrast and without flickers, blurs or other disturbing factors. A closed circuit TV-system must provide a better picture than on a normal TV- set. An unsharp picture with image retention and other negative features will make you feel tired. Lower your motivation, or disappoint you. Magnivision has avoided all these pitfalls. And this costs. But such extra costs are well worthwhile since Magnivision is the only CCTV system to provide this first-class picture. It can be used for hours without any negative effects. Thanks to its high quality picture and extra features!
Consequently, Magnivision is the only CCTV system approved by authorities in a number of countries. They have been convinced by objective tests that its high quality picture is necessary for persons with residual vision.

Contrast
ontrast C

CONTRAST.

A sharp steady picture and maximum contrast – two important features of Magnivision. Its sharp picture is controlled by the focusable camera. The contrast is controlled by a switch on the monitor. Extra fine contrast is required when you need to read fuzzy print or a black text on a colored background.



ADJUSTABLE SCREEN ANGLE.

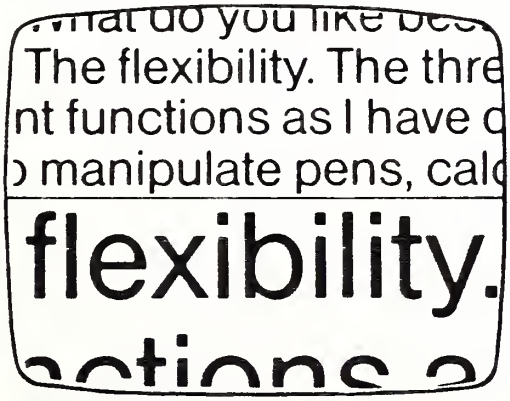
This system looks like any other conventional visual display unit. It does not attract unnecessary attention, and the monitor screen can be tilted. You can select your own reading angle depending on your height, reading distance or whatever you require Magnivision for.

Contrast Inversion

NEGATIVE PICTURE.

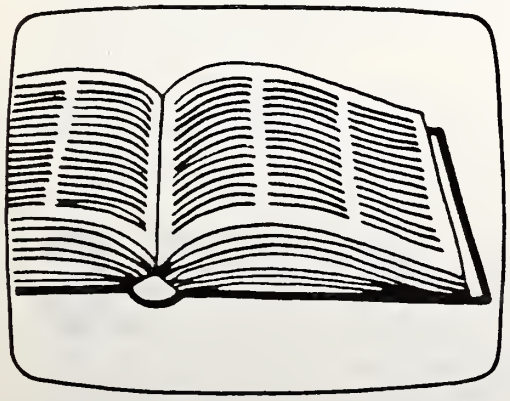
A switch on the monitor enables you to change from black-text-on-white to white-text-on-black. This is important when you want to avoid excessive light due to photophobia or fatigue. Magnivision is designed to suit any eye defect. The positive picture is required whenever you view photographs or use tools under the camera.

r than on a normal TV-set.



ELECTRONIC CURTAINS.

The use of a framing module makes it possible to project only the most important section of the text on the monitor screen. All excessive light disappears. This is of great help to light-sensitive persons as well as making it easier to locate the required line of text on the screen. Such "tricks" can be built into Magnivision as an extra feature.



DEPTH OF FIELD AND FOCUS.

This is one of Magnivision's most practical features. It allows you to browse through a thick catalogue without needing to alter the focus. You can view irregular-shaped objects and still keep the picture on the monitor sharp. You also benefit by being able to use mechanical tools under the camera. You can sew, knit or perform many other tasks.

MAGNIFICATION.

The maximum magnification factor on the screen is 36 using the table stand or the hand camera. 30 with the camera arm. If you sit 10 cm away from the monitor the effective maximum magnification factor on the retina is about 144. Visually impaired persons with very limited residual vision can be helped by Magnivision. For many of them it is the only way to see, or to use their eye sight for a longer period of time. You select the required magnification level very quickly by means of the easy-to-find zoom lens controls.

A person with just a few percent of normal visual acuity is in practical and social terms a blind person. But even he or she can learn to read quite well thanks to Magnivision. And without eye strain. The above illustration shows you what "split-screen" means. Using two cameras as well as a reference and framing module this is an easy trick – and a very practical one! You can for instance see a manuscript and the typed text at the same time.

A CLEAR PICTURE.

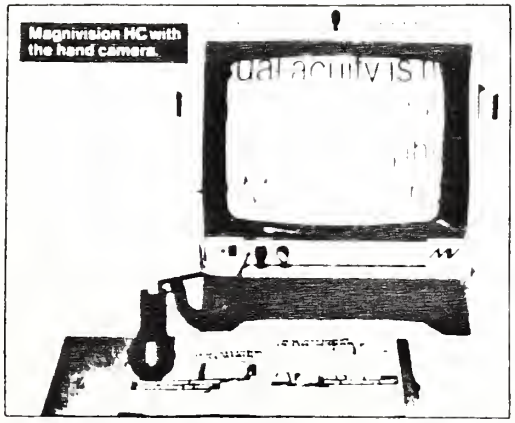
It is difficult to show a good TV-picture in a brochure. And picture quality has been our biggest challenge. Objective tests carried out in many countries prove that a Magnivision picture is flicker-free and possesses a higher frequency than that of a normal TV-set. But seeing is believing. Compare Magnivision with other systems for yourself!

The Three Versions of Magnivision.

1. MAGNIVISION HC.

The first standard version is comprised of the monitor, the hand camera, the camera holder and the reading table. This system is a lightweight, flexible alternative at home or in a work situation. It does not occupy very much space on a normal desk and enables you to read a newspaper or a recipe, use a calculator, fill in a form or write a letter. The camera extends as far as your arm can reach.

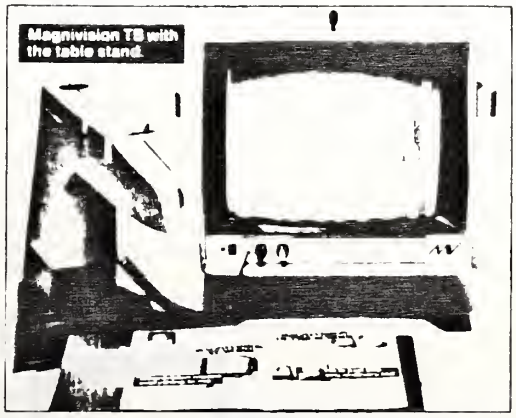
Magnification factors: Held in the hand: 13 – 36
In the holder: 5 – 36 (with extra light).


Magnivision HC with the hand camera.

2. MAGNIVISION TS.

In this version the camera unit has been placed in the table stand. Like all standard versions it includes the reading table which enables you to read fast with the table placed under the stand. Its most practical aspect, however, is its large depth of field. This gives you a wide area within which to carry out a variety of tasks. With the focus setting unaltered.

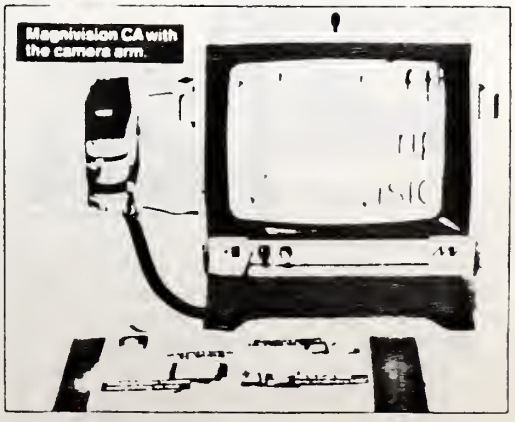
Magnification factor: 6 – 36.
Depth of field: max 150 mm, min 24 mm.
Distance camera – table: 300 mm.


Magnivision TS with the table stand.

3. MAGNIVISION CA.

The third version is a very compact system. The camera arm is mounted on a bracket on the left- or right-hand side of the monitor and can be moved through almost 270°. It can be used to check a drawing, or when you need to move the camera from one sheet of paper to another. The camera arm is the latest addition to our camera range and possesses the advantages of all the others, but is more compact.

Magnification factor: 5 – 30.
Depth of field: max 150 mm, min 18 mm.
Distance camera – table: 300 mm.


Magnivision CA with the camera arm.

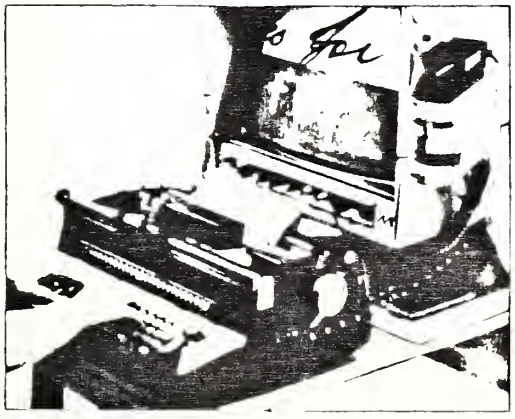
Accessories – developed to satisfy individual needs.

Yes, you can choose between these three versions of Magnivision. But, in order to satisfy individual needs a wide range of accessories has been developed. Over the years we have come across different problems and we have solved most of them!
Some have been very individual. Others were of a more general nature – like the ones presented on this page.

REFERENCE AND FRAMING MODULE.

There are two types of reference and framing modules. Module I is used when you want horizontal lines or frames on the screen while Module II enables you to have vertical lines or frames. If you want to use two cameras at the same time then you must have Module I. The picture from one camera can be displayed on the upper part of the screen, and that from the other camera on the lower part. This is what we mean by "split-screen". The two pictures have separate contrast, light, focus and magnification controls.

TYPEWRITER CAMERA.

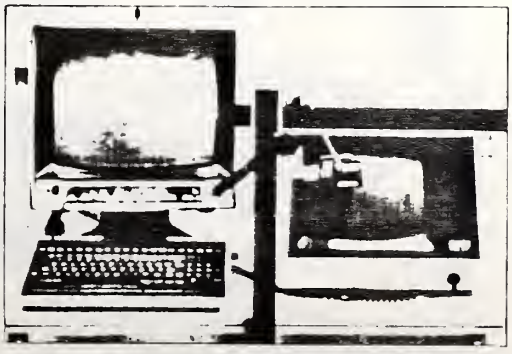


The typewriter camera was one of the first applications developed for a work situation.
Using the typewriter attachment you can read manuscript and typed text at the same time.
The system is designed for IBM or FACIT electric typewriters.
Many job opportunities have been made available and much more accessible for visually impaired persons thanks to the typewriter camera.

24" MONITOR.

With the 17" monitor you will have a very compact system. In some cases this monitor will not provide enough magnification. With the 24" screen magnification is more than 30% higher.

VDU – CAMERA.

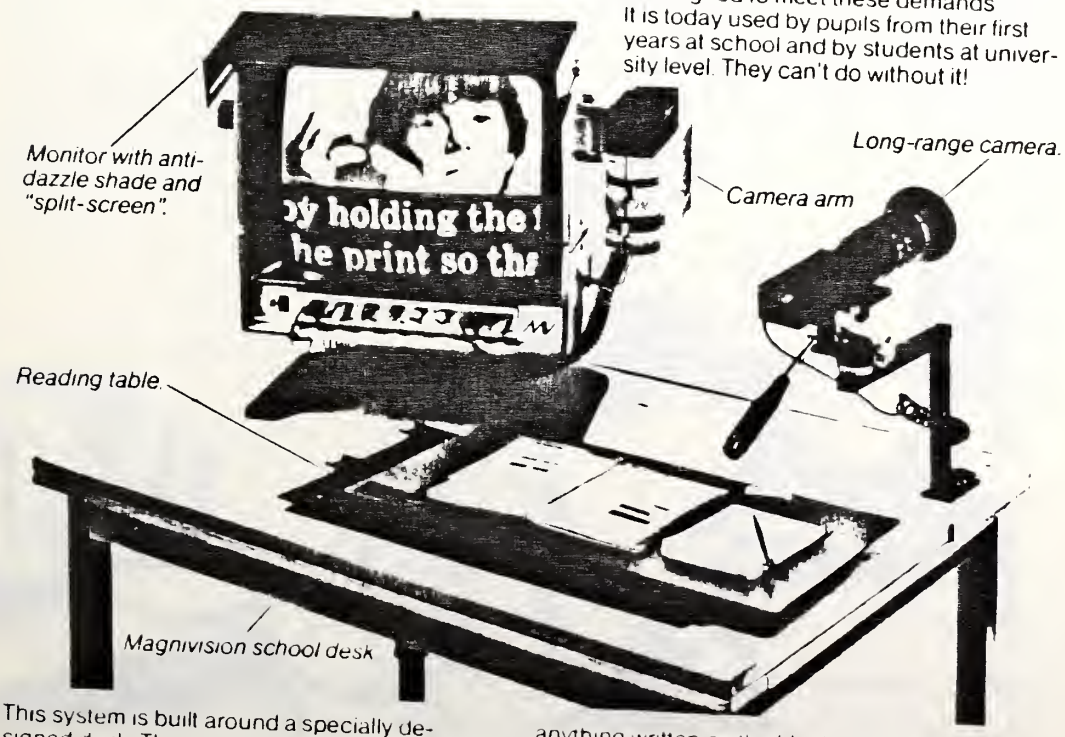


Many jobs involve the use of computer terminals or other visual display units, but the letters are too small to be seen by visually impaired persons. We have chosen this system to magnify anything shown on any visual display unit. We think this is the right approach – and it works fine!

Magnivision at school is a complete system.

Magnivision at school has been of very great benefit to many children in Sweden. Today more than 80 pupils use it regularly. Thanks to Magnivision they can be integrated in a normal school situation and live at home with their families. We consider that Magnivision is a means of preventing blindness. When blind children use Magnivision they function almost as well as sighted.
There is, however, no contradiction between learning to read Braille and using Magnivision at the same time.

Children with residual vision are most often likely to continue using a CCTV system for the rest of their lives. We want these children to have the best in order to provide them with an ergonomically sound solution. In this way they will gain greater perseverance and become more competetive.
The demands on a CCTV system used by visually impaired children are very strict. And it must be easy to use. Teachers should still be able to employ the same teaching methods that they are used to. School Magnivision is a complete system designed to meet these demands.
It is today used by pupils from their first years at school and by students at university level. They can't do without it!



This system is built around a specially designed desk. The main camera and the monitor can be selected from one of the three Magnivision versions. In this example the reading table is placed under the camera arm. The long-range camera has a zoom lens with a magnification range from 0.3 to 1.8. This means a magnification factor of between 3 and 18 if the pupil sits 30 cm from the monitor. It is easy to read anything written on the blackboard. Using the reference and framing module it is possible to use the long-range camera and the main camera simultaneously, i.e. "split-screen operation". This is one example of how Magnivision can be designed to function for a school situation. But using other accessories, it is possible to adapt it to individual needs and to the shape of the classroom.

Magnivision Users tell you what they think about their system.

"I AM 76 YEARS OLD."

My name is Josef Ahnesjö. I am 76 years old, but I consider myself to be an active visually impaired person. Until recently I hade quite a problem. When my eye disease worsened, I managed to read with optical aids in spectacle frames for some years. My macula degeneration got worse, and I didn't know what to do. I couldn't use my spectacles anymore. Then Magnivision came into my life. Now I am back where I started. I can read my paper in the morning and can still collect stamps. I am also a sort of janitor for the apartment house we live in. In that job there are quite a few papers to check and sign. I like to be busy and to have something meaningful to do. Magnivision gives me that chance.

"I'M ADDICTED TO MY MAGNIVISION."

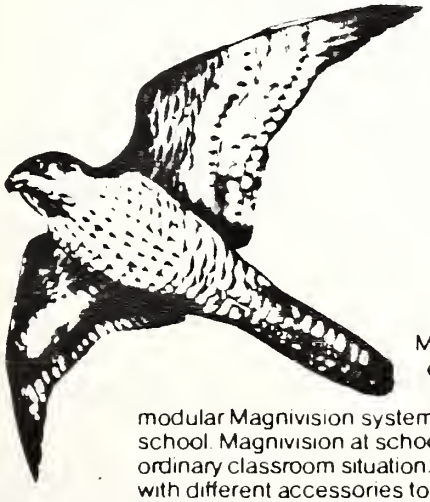
Sonja Widmark,
– My vision is very poor due to my diabetes. Well, I think you should label me as a blind person. I cannot manage without a white cane out of doors. But I can read normal print with my Magnivision units.

– I have two of them. One at the office and the other at home. I work as an executive secretary. I have a two-camera system which enables me to look at two things at the same time, a manuscript and the law book, for example.

MAGNIVISION REPORTS

I had some training at the low visionclinic, and after a few weeks my Magnivision unit was installed in my home. It fits in quite well on a normal desk. Now, I don't know what I'd do without it.
My Magnivision is on several hours a day. It has become a pleasant habit to use it.

– I have lots of leisure-time activities like ceramics, knitting, weaving and so on. I'm even considering taking up English lessons again!
– Magnivision has become a good friend I'm addicted to.
Magnivision is the only way to read and continue with my hobbies.



Magnivision is available in three different standard versions depending on how the camera unit is mounted. The modular Magnivision system can also be used at work or at school. Magnivision at school is a two-camera system used in an ordinary classroom situation. Magnivision at work can be equipped with different accessories to satisfy many needs of visually impaired persons. Three cameras with different functions are sometimes used. Development of the Magnivision CCTV system is an on-going process!

We are proud of the support we have had so far. In some countries Magnivision is the only CCTV system used by visually impaired persons and approved by government authorities. High-quality Magnivision is more beneficial than a low-price CCTV system, and we will continue to develop Magnivision accessories in line with that principle. It pays in the long run.

Magnivision was developed by ElektronOptik of Växjö, Sweden, in collaboration with visually impaired persons, the Swedish Board for Technical Development and the Swedish Institute for the Handicapped. Personnel from rehabilition institutes also helped us to make Magnivision a new and valuable aid for many persons with partial sight.

Manufactured by:

MAGNIVISION

ELEKTRONOPTIK AB

Storgatan 30, S-352 31 Växjö, Sweden.
Phone 46 (0) 470/145 90 Telex 52147 EOSWED S

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